

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

EMC CORPORATION,)
EMC INTERNATIONAL COMPANY,)
And EMC INFORMATION SYSTEMS)
INTERNATIONAL,) Trial Volume 2
)
Plaintiffs,)
) C.A. No.
v.) 13-1985-RGA
)
Pure STORAGE, INC.,)
)
Defendant.)

Tuesday, March 8, 2016
9:00 a.m.
Courtroom 6A

844 King Street
Wilmington, Delaware

BEFORE: THE HONORABLE RICHARD G. ANDREWS
United States District Court Judge

APPEARANCES:

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-and-

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Counsel for the Defendants

1 THE COURT: Good morning,
2 everyone. Please be seated. So how is
3 everybody?

4 MR. VAN NEST: Fine, Your Honor.
5 Thank you.

6 THE COURT: Do you have anything
7 for me?

8 MR. VAN NEST: We do. Good
9 morning.

10 THE COURT: Good morning.

11 MR. VAN NEST: I think one of the
12 witnesses this morning will be Professor Li.

13 THE COURT: Professor who?

14 MR. VAN NEST: Li. He's the
15 inventor of the '464. And he was, as you
16 recall, well, disclosed late. You offered some
17 curative discovery and we've taken that. I
18 think they expect to call him on a number of
19 subjects related to commercial success of Data
20 Domain. And while I don't object to him talking
21 about his invention and whatever invention story
22 he has, for a number of reasons it would be
23 improper to allow him to do that now. Number
24 one, he was never disclosed to somebody on

1 commercial success and the first time that
2 anything came out of his mouth on it was during
3 the curative phase, which we were given to cure
4 the fact that he hadn't been disclosed earlier
5 and they hadn't ever talked about an earlier
6 invention date. Number two, with obviousness
7 out, I question any testimony really about the
8 commercial success of Data Domain. They are not
9 seeking damages based on any Data Domain
10 products. Data Domain is not in the same market
11 with Pure or XtremeIO. Data Domain never made a
12 Flash product. They are not even in the primary
13 storage market.

14 So for a number of reasons,
15 leading off really with discovery, I think that
16 shouldn't be allowed. I believe the most
17 offensive part of it will be testimony from him
18 about revenues from Data Domain's products.
19 They have product revenues, obviously. Again,
20 those products don't compete with either
21 XtremeIO or Pure. They are large numbers.
22 They'd be prejudicial, and again, the relevance
23 of that, if there is any, is minimal. And it
24 wasn't disclosed until very late in the game.

1 He was not a Rule 26 disclosure on commercial
2 success and he didn't -- he wasn't proffered
3 during discovery on that. We didn't take any
4 discovery.

5 During the curative phase, it's
6 true, when we were done asking about conception,
7 they lobbed in some redirect for the very first
8 time without having given us any notice ahead of
9 time and that's why I know this is coming or may
10 be and I don't think it's proper.

11 THE COURT: All right.

12 MR. KREVITT: Your Honor, very
13 briefly, we can address the relevance of the
14 commercial success of Data Domain if you'd like,
15 but there's a much shorter answer to this.

16 THE COURT: Okay.

17 MR. KREVITT: Pure Storage filed a
18 motion in limine on Doctor Kai Li. The motion
19 in limine was directed specifically to
20 commercial success. Doctor Kai Li should not be
21 permitted to testify with respect to commercial
22 success. That was a motion in limine submitted
23 to this court. We had argument on that. Part
24 of that motion in limine that Pure Storage filed

1 was that EMC should not be able to call Frank
2 Sloodman.

3 The parties went away after Your
4 Honor reserved ruling on some of the motions in
5 limine. We had extensive, more than you might
6 imagine, negotiations on these topics, multiple
7 drafts going back and forth and the resolution
8 was this and memorialized and submitted to Your
9 Honor in a writing, in exchange for withdrawing
10 our request to call Frank Sloodman, so we
11 forewent any --

12 THE COURT: I remember seeing a
13 letter. I don't remember exactly what it said.
14 Do you have a copy of it?

15 MR. KREVITT: We are putting our
16 hands on it now. I didn't -- I didn't
17 anticipate this issue being raised this morning,
18 I apologize.

19 THE COURT: No need to apologize.

20 MR. KREVITT: I can represent to
21 Your Honor, not in hoc verba, but having
22 participated in the discussions, the deal was we
23 were going to withdraw Frank Sloodman so we were
24 telling Your Honor rule in their favor on the

1 Frank Sloodman motion in limine effectively.
2 And in exchange, explicitly in exchange, Pure
3 Storage withdrew all objections to EMC calling
4 Doctor Kai Li, including with respect to
5 commercial success.

6 THE COURT: Okay. So Mr. Van
7 Nest, you recall this letter?

8 MR. VAN NEST: I've been reminded
9 of it. But there's two things that are not
10 correct. One is that's before we removed any
11 obviousness case on the deduplication. Right?
12 In other words, at that time, we still
13 maintained an obviousness case and commercial
14 success is relevant to that. We've withdrawn
15 that as to the deduplication patents.

16 THE COURT: Okay. So that's
17 really -- that's a different argument than
18 saying, you know, it's a discovery violation.
19 That's saying it's not relevant.

20 MR. VAN NEST: That's right. I
21 said this morning that without obviousness, it's
22 not -- but the other point is, I don't believe
23 we withdraw all our objections. I think the
24 objection we may have withdrawn as to late

1 discovery. If that's true, of course, that's my
2 fault for raising it. But I do think that we
3 reserved other objections to relevance and the
4 like. And right now --

5 THE COURT: I would imagine you
6 did -- that relevance wasn't decided by the
7 letter.

8 MR. VAN NEST: Sure.

9 THE COURT: But since you let off
10 with is a discovery violation, sounding to me
11 like that's actually been resolved.

12 MR. VAN NEST: It may have been.
13 But look where we are in the trial now. We
14 don't have an obviousness case. It's clear that
15 Data Domain is not even in the market.

16 THE COURT: All right. So let me
17 go back. Mr. Krevitt was promising a short
18 solution and he did cut off your first leg. How
19 about the second leg?

20 MR. KREVITT: It was the only leg
21 raised with us, so I now have another leg to
22 deal with. The short answer to that is there is
23 no dispute in this case that the Data Domain
24 product embodies the patents in suit, two of the

1 patents in suit, the deduplication patents, the
2 '015 and '464. That's where we start. We're
3 talking about relevance. There's no dispute
4 about that. The success of the product that
5 incorporated the technology is explicitly and
6 highly relevant to damages, including lost
7 profits and reasonable royalty. In fact --

8 THE COURT: So the product -- so
9 first off when you talk about the success of the
10 Data Domain, what you're actually talking about
11 is revenues for something that Data Domain sold;
12 right?

13 MR. KREVITT: Yes, Your Honor.
14 Revenues attributable to products embodying the
15 patented invention.

16 THE COURT: And right. So I just
17 want to make sure because, you know, we're
18 talking kind of general terms, Data Domain
19 success, what we're really talking about is
20 numbers relating to some product or product that
21 Data Domain sold; right?

22 MR. KREVITT: Your Honor has it
23 exactly right. In fact, it's an important
24 distinction because you may recall my colleague,

1 Mr. Torchia, tried to convince the Court that we
2 should be able to put in the --

3 THE COURT: Right.

4 MR. KREVITT: And this was
5 precisely the distinction that the Court drew
6 which was that's to attenuated to talk about a
7 big price, this is revenues directly
8 attributable to the product.

9 THE COURT: This may not be --
10 what is the name of the product that Data Domain
11 sold?

12 MR. KREVITT: I think it was
13 called Data Domain.

14 MR. TORCHIA: I believe it's
15 called Data Domain Deduplication DDR.

16 MR. KREVITT: Data Domain
17 Deduplication.

18 THE COURT: And this was sold over
19 what time period?

20 MR. TORCHIA: So Your Honor, this
21 was sold from 2003 all the way up past the
22 acquisition, and still on the market and Dr. Li
23 has personal knowledge of the revenues of the
24 patented product.

1 THE COURT: So you say,
2 Mr. Krevitt, that it is undisputed that the body
3 of the patent or two of the patents, is that, in
4 fact, correct, Mr. Van Nest?

5 MR. VAN NEST: Excuse me, Your
6 Honor, I was looking at the letter.

7 THE COURT: Okay. Mr. Krevitt
8 says that the sales of these Data Domain
9 products embodied the patent.

10 MR. VAN NEST: There is no opinion
11 in the case to that fact. Mr. Jestice, their
12 expert, does not go through a technical analysis
13 of any kind to tie the products to the patents
14 and that's the thing we have been saying, there
15 is no nexus to these patents.

16 THE COURT: Right. And by nexus,
17 you just mean does it practice the patent?

18 MR. VAN NEST: There is no opinion
19 from any technical expert or witness in the
20 case, Jestice didn't --

21 THE COURT: I got your point
22 there.

23 Mr. Torchia.

24 MR. TORCHIA: Mr. Rosenberg is

1 about to show you that there is such an opinion.

2 MR. KREVITT: There is an opinion,
3 Your Honor. Dr. Li, Mr. Rosenberg will come,
4 Dr. Li is sitting in the room.

5 THE COURT: Over there?

6 MR. KREVITT: Over there.

7 THE COURT: You pointed to
8 Mr. Shaw.

9 MR. KREVITT: And in a half hour
10 is going to testify that it embodies and for
11 purposes of relevance, to understand relevance,
12 we should assume that the product embodies the
13 patents. We're happy to show you that there is
14 evidence of that.

15 THE COURT: I would like to see
16 that evidence because apparently you have it
17 easily at hand.

18 MR. KREVITT: Yes, and we also --

19 MR. TORCHIA: We're about to put
20 it up on the screen.

21 THE COURT: Okay.

22 MR. VAN NEST: Again, as Your
23 Honor knows, Dr. Li was certainly never
24 disclosed as an expert on this topic and never

1 presented during discovery on it. The first
2 time we talked to him was after summary judgment
3 when they threw him in on conception, so if
4 there is an opinion, it's news to me and it's
5 very late.

6 MR. KREVITT: Your Honor, Dr. Li
7 was identified in Pure Storage's initial
8 disclosures. They could have deposed him at any
9 time and chose not to.

10 MR. TORCHIA: This is --

11 THE COURT: So that looks like
12 page 127 of somebody's expert report.

13 MR. KREVITT: This is our expert,
14 Your Honor.

15 THE COURT: The name of your
16 expert?

17 MR. KREVITT: Ian Jestice.

18 THE COURT: So, I mean, without
19 knowing, recalling exactly -- so five of those
20 six claims, and some number of the '464 patent
21 claims.

22 MR. KREVITT: Yes, Your Honor.

23 THE COURT: Okay.

24 MR. KREVITT: If you go further,

1 claim 32.

2 THE COURT: What do you have to
3 say about that, Mr. Van Nest?

4 MR. VAN NEST: May I have a
5 moment, Your Honor?

6 He has an opinion in his report,
7 Your Honor. It's not much. He doesn't cite the
8 source code or do any analysis, he cites
9 testimony, but he has an opinion.

10 THE COURT: So he has an opinion.
11 I think from what I'm gathering, though, Mr. Van
12 Nest, you were just looking at the letter, that
13 you know, the objections about we didn't know
14 about this or that, that seems to have been lost
15 in this letter, so it's really a question of
16 whether it's relevant or not.

17 And I guess the success of,
18 commercial success of the product that embodied
19 the patents is something that is listed in the
20 Georgia-Pacific factors as a consideration, so
21 unless I hear something else, I'm going to let
22 him do it.

23 MR. KREVITT: As well as for lost
24 profits.

1 MR. VAN NEST: I don't know why
2 there should be any discussion of the numbers
3 themselves, Your Honor, apart from the fact that
4 the product was successful. Particularly given
5 the state of the record now, where obviousness
6 is out, and it may be a minor Georgia-Pacific
7 factor, but you know, their expert doesn't rely
8 on the numbers. Their expert in the expert
9 report doesn't say I'm relying on, he's got a
10 sentence on commercial success that doesn't go
11 into any detail at all.

12 THE COURT: What does the sentence
13 say?

14 MR. VAN NEST: He says I
15 understand that the products have been
16 commercially successful.

17 THE COURT: I think they can put
18 in some evidence to support that opinion.

19 MR. KREVITT: Thank you, Your
20 Honor.

21 MR. VAN NEST: Very well, Your
22 Honor.

23 THE COURT: All right. Is there
24 anything else?

1 MR. VAN NEST: I'm not aware of
2 anything else, Your Honor.

3 THE COURT: Mr. Krevitt, do you
4 have anything else?

5 MR. KREVITT: Not at the moment,
6 Your Honor. Mr. Torchia said something to me.

7 THE COURT: Do you want to speak
8 to him for a second?

9 MR. KREVITT: I don't think I need
10 to raise it right now, Your Honor.

11 THE COURT: All right. And so
12 just I'll leave in a minute so you can do your
13 last second things, but the order of battle this
14 morning, Mr. Krevitt, is what?

15 MR. KREVITT: Yes, Your Honor. So
16 Mr. Cobb, our witness from yesterday is still on
17 cross-examination. We understand there is
18 another fifteen or twenty minutes, or maybe that
19 grew overnight.

20 THE COURT: Or maybe it shrunk.

21 MR. KREVITT: Hopefully it shrunk.
22 And then there may be some redirect, I don't
23 anticipate that will be very long.

24 THE COURT: This is too much

1 detail. Who is coming after Cobb?

2 MR. KREVITT: Got it. Dr. Li.

3 THE COURT: Now, you expect the
4 direct of him to be in the ballpark of?

5 MR. KREVITT: Forty minutes.

6 THE COURT: And so probably we'll
7 have some other witness before lunch. Do you
8 expect to do depositions or what?

9 MR. KREVITT: I don't think so,
10 Your Honor. I think what we would do right then
11 is get started with Mr. Jestice, our technical
12 expert on the dedup patents.

13 THE COURT: If we do that, that
14 will certainly take us to lunch.

15 MR. KREVITT: Yes.

16 THE COURT: Okay. I'll be back
17 in.

18 MR. KREVITT: Your Honor, there is
19 one issue that I'm sorry, I should have told you
20 before you stood up that the parties are still
21 conferring about, so we're happy to continue to
22 confer, I just don't want too much time to go by
23 without raising it with the Court. But if you
24 prefer us to see if we can work it out.

1 It deals with an issue from our
2 perspective, an issue that was raised in Mr. Van
3 Nest's opening statement that opened the door to
4 revisiting some rulings that Your Honor made
5 earlier.

6 THE COURT: Well, as you may have
7 noticed, I was listening to your opening
8 statements. So I didn't hear anything, but I
9 wasn't listening to it with the same attention
10 to detail that I'm sure you were. If you want
11 to give me a suggestion as to what it is, I'm
12 happy -- I don't want to resolve it now, I think
13 you should talk to each other, but it will help
14 me to think about it.

15 MR. KREVITT: I'm happy to do
16 that, Your Honor. I didn't want too much time
17 to past, but at the same time we are candidly
18 speaking about it.

19 As Your Honor may recall, another
20 motion in liminae was Pure Storage had moved to
21 prevent EMC from introducing evidence about Pure
22 Storage's IPO, how much money it has, it's
23 financial condition, it's got a lot of money.
24 And Your Honor --

1 THE COURT: What did he say that
2 opened this up?

3 MR. KREVITT: And what we said at
4 the time when we opposed that was that we had
5 concerns that Pure Storage was going to portray
6 itself as the little guy in the marketplace. In
7 fact, we specifically said David and Goliath.

8 THE COURT: I think you said that
9 in your opening.

10 MR. KREVITT: No, I don't think
11 so, Your Honor. I don't believe so, if I did, I
12 certainly didn't mean to. And Mr. Van Nest said
13 exactly the issue, exactly the issue that we
14 were concerned about, Your Honor, portrayed and
15 using the words, we, Pure Storage, are the
16 little guy in the market. We believe it's
17 relevant to a whole host of issues. As I say,
18 we're talking about ways to handle it, either
19 with stipulations or otherwise.

20 THE COURT: He'll let you all
21 continue to talk about that. I do appreciate
22 you bringing it up, because -- I do appreciate
23 you bringing it up. We'll be in recess for a
24 few more minutes.

1 (A brief recess was taken.)

2 THE COURT: All right. We're
3 going to get the jury. Mr. Cobb, you can come
4 forward and take the witness seat if you hurry
5 up.

6 THE WITNESS: Thank you, Your
7 Honor.

8 THE COURT: Good morning, members
9 of the jury. Everyone, you may be seated.
10 Members of the jury, thank you all for being
11 here on time and we're on time too, so Mr.
12 Werdegarr, you may continue your
13 cross-examination.

14 MR. WERDEGAR: Thank you, Your
15 Honor.

16 BY MR. WERDERGAR:

17 Q. And good morning, Mr. Cobb.
18 Welcome back.

19 A. Good morning. Thank you.

20 Q. You testified yesterday that EMC
21 introduced a version of its VMAX product with
22 some Flash and some hard disks back in 2008,
23 right?

24 A. Yes, a hybrid array.

1 Q. The hybrid array, right. Now that
2 hybrid array that EMC began offering in 2008 did
3 not have deduplication, right?

4 A. That's correct.

5 Q. Okay. And EMC did not add
6 deduplication to its VMAX product after it
7 acquired Data Domain, did it?

8 A. That's correct.

9 Q. Okay. And did EMC last month
10 introduced a new All-Flash version of its VMAX
11 product, right?

12 A. Yes, sir, we did.

13 Q. Okay. And that new All-Flash
14 version of VMAX does not have data
15 deduplication, right?

16 A. No, it does not.

17 Q. Okay. Now, Mr. Cobb, you're
18 familiar with the term use case in the storage
19 context, aren't you?

20 A. Yes. It's used in several
21 different ways, but I'm generally familiar with
22 it.

23 Q. And one way it's used is to
24 describe how a customer will be using the

1 storage product, correct?

2 A. That's correct.

3 Q. So they might have a data base use
4 case, for example, in connection with a data
5 base application; is that right?

6 A. Yes, that's correct.

7 Q. And it's correct, is it not, that
8 there are uses for a storage product for which
9 data deduplication provides little or no
10 benefit, correct?

11 A. Yes, some use cases have more
12 duplicate data than other use cases do.

13 Q. And some use cases are essentially
14 not deduplicable; is that correct?

15 A. Correct. The benefits of
16 deduplication for that would be marginal.

17 Q. Okay. For example, for many data
18 base use cases, there is little or no space
19 saving benefit from deduplication, correct?

20 A. When compared to the other use
21 cases, data bases tend to deduplicate less.

22 Q. And so for those use cases, you
23 need other data reduction technologies to save
24 space, right, if you want to do data reduction?

1 A. That's correct.

2 Q. So, for example, with data base
3 use cases, compression is the primary data
4 reduction technology for those use cases,
5 correct?

6 A. Compression is one of the
7 technologies for that use case. It's not the
8 only.

9 Q. Okay. But compression is
10 certainly one that has a big benefit for data
11 base use cases, correct?

12 A. Compression often has a 2 to 1
13 benefit.

14 Q. Okay. And for the first full year
15 after it was generally released in 2013,
16 XtremeIO did not have a compression data
17 reduction feature, correct?

18 A. That's correct.

19 Q. Okay. And as we discussed
20 yesterday, Mr. Cobb, EMC bought XtremeIO in May
21 of 2012, right?

22 A. Yes.

23 Q. Yeah. And you testified yesterday
24 that EMC was working with XtremeIO from about

1 2008 onwards; is that right?

2 A. Yes, that's right.

3 Q. Okay. And XtremeIO did not
4 generally release its product for sale until
5 November of 2013, right?

6 A. Yes, that's correct.

7 Q. Okay. So despite all the
8 assistance that EMC provided XtremeIO that you
9 described yesterday, it still took five years
10 for XtremeIO to generally release a product,
11 right?

12 A. Yes, that sounds about right.

13 Q. And after EMC acquired Xtreme IO
14 in 2012, the delay in getting XtremeIO generally
15 released caused senior executives within EMC to
16 be concerned that XtremeIO was late to market,
17 correct?

18 A. Yes, there was concern that the
19 All-FlashArray market was developing more
20 quickly than we expected.

21 Q. Would you turn to Exhibit 810 in
22 the binder of exhibits before you?

23 A. All set.

24 Q. Okay. And is this an e-mail that

1 you received from Zahid Hussein on May 30, 2013?

2 A. Yes, it is.

3 MR. WERDEGAR: Okay. I would like
4 to offer Exhibit 810 into evidence.

5 MS. DOMINGUEZ: No objection.

6 THE COURT: Thank you. Admitted
7 without objection.

8 BY MR. WERDERGAR:

9 Q. And Mr. Hussein, at the time that
10 he sent this e-mail out, was the head -- Mr.
11 Hussein, at the time he sent this e-mail out,
12 was the head of the Flash Products Group within
13 EMC, correct?

14 A. That's correct.

15 Q. And one of Mr. Hussein's
16 responsibilities was XtremeIO, correct?

17 A. Yes, that's right.

18 Q. Okay. Now, Mr. Hussein is
19 forwarding to you and some others at EMC an
20 e-mail from Josh Goldstein, correct?

21 A. Yes.

22 Q. Okay. And if we look at Mr.
23 Goldstein's original e-mail that he sent on May
24 29, 2013, Mr. Goldstein wrote in his original

1 message, Pure Storage announced version 3.0 of
2 the Purity operating system today, along with
3 updated hardware. Do you see that?

4 A. Yes, I do.

5 Q. Okay. And at the time Mr.
6 Goldstein sent his e-mail, XtremeIO did not yet
7 have a product generally available, right?

8 A. That's correct. This was in May.

9 Q. Okay. And he writes in his
10 e-mail, the changes of note are detailed below
11 and we'll send a competitive bulletin to the
12 field. However, amongst of the leadership team,
13 I want to make sure to send a clear message that
14 we are now 14 months behind Pure on features and
15 while I believe our performance advantage still
16 exists, its being progressively marginalized.
17 Do you see that?

18 A. Yes, I do.

19 Q. And you understood at the time
20 that this was coming from the head of marketing
21 and product management for XtremeIO, right?

22 A. Yes, that was Josh's role.

23 Q. Yeah, those were the concerns he
24 was expressing, correct?

1 A. Yes, he was representing product
2 marketing concerns.

3 Q. Okay. And then he writes in his
4 e-mail still, I know we are heads down for GA,
5 and that's general availability, right?

6 A. Correct.

7 Q. And I know we are heads down for
8 GA, but we have to begin a catch up and overtake
9 plan. Our advantages won't matter to most
10 accounts when we have a 14 plus month feature
11 deficit and as Pure gains more market
12 credibility and wins more accounts. Do you see
13 that?

14 A. Yes, I do.

15 Q. And you understood that Mr.
16 Goldstein, the head of product management and
17 marketing for XtremeIO was proposing that EMC
18 needed to begin a catch up and overtake plan to
19 catch up with Pure, right?

20 A. Yes, that was his opinion.

21 Q. And it was his opinion as the head
22 of marketing at product management for XtremeIO,
23 right?

24 A. Yes, it was.

1 Q. Okay. Now -- oh, actually, let's
2 just back up, because there's one more question
3 there. Mr. Hussein, who is the head of the
4 Flash Products Group, then writes back the next
5 day, actually forwards Mr. Goldstein's message
6 the next day to you and other executives at EMC,
7 right?

8 A. That's correct, sir.

9 Q. Okay. And at that time Mr.
10 Hussein wrote to you, like Josh, I'm
11 increasingly concerned about how late XtremeIO
12 is to market. So you understood when you
13 received this, did you not, that Mr. Hussein,
14 who is in charge of XtremeIO, was increasingly
15 concerned about how late it was to market,
16 right?

17 A. Yes, Mr. Hussein was
18 understandably concerned.

19 Q. Mr. Cobb, EMC has a group within
20 the company that prepares various forms of
21 information concerning EMC's competitors in the
22 marketplace; is that right?

23 A. Yes, sir, that function is
24 performed in several areas.

1 Q. Okay. And one area is called the
2 Competitive Intelligence Group, right?

3 A. That's correct.

4 Q. Okay. Could you turn to Exhibit
5 807 in your cross-examination binder, please?

6 A. Okay.

7 Q. Okay. And Exhibit 807 is a
8 document entitled All-FlashArray competition,
9 correct?

10 A. That's correct.

11 Q. And it's dated October 29, 2013?

12 A. Yes, sir.

13 Q. Okay. And this is the type of
14 report that you normally would have received in
15 your role at EMC, right?

16 A. Yes, it is.

17 Q. Okay. And you know the authors of
18 this document Andy Watson and Brian Durick,
19 right?

20 A. Yes, I do. I work with them
21 often.

22 Q. And they're both contributors to
23 EMC Competitive Intelligence Group; right?

24 A. Correct.

1 MR. WERDEGAR: I would like to
2 offer Exhibit 807 into evidence.

3 MS. DOMINGUEZ: No objection.

4 THE COURT: Admitted without
5 objection.

6 BY MR. WERDEGAR:

7 Q. Here is a the document and if we
8 could go to page nine of this document. And
9 this is a page entitled irresistible lure of VDI
10 for AFA. And Mr. Cobb, VDI is a virtual desktop
11 infrastructure?

12 A. That's correct.

13 Q. And that's one of the big use
14 cases for all-Flash storage?

15 A. That was one of the initial
16 targets for all storage was deduplication.

17 Q. And AFA stands for all-Flash
18 array; is that right?

19 A. That's correct.

20 Q. And the Competitive Intelligence
21 Group at EMC as of October 29, 2013 is stating
22 that VDI is an insanely crowded Flash storage
23 market. Do you see that?

24 A. Yes, I do.

1 Q. And then below that there is
2 subbullet point the second one, the Competitive
3 Intelligence Group reports all dedupe
4 implementations have an obvious huge impact,
5 therefore, relatively easy to go to market. Do
6 you see that?

7 A. Yes.

8 Q. And, in fact, as of the date of
9 this document, October of 2013, there existed in
10 the storage market a number of different
11 deduplication implementations; correct?

12 A. Yes, sir, that's correct.

13 Q. Now, if we could turn to page 32.
14 And this is a portion of the report that's
15 labeled key takeaways. Are you there yet,
16 Mr. Cobb?

17 A. I'm just getting there.

18 Q. It's also on the screen in front
19 of you. It's easier.

20 A. My eyesight, the printed page is
21 much better. Thank you.

22 Q. Are you there now?

23 A. Yes, I am.

24 Q. And this is a page labeled key

1 takeaways?

2 A. Yes.

3 Q. And in the upper right-hand corner
4 of this page is a label, insanely crowded
5 market, competition will be fierce(r), and there
6 is a little R in parentheses; right?

7 A. Correct.

8 Q. So did you understand -- strike
9 that.

10 Was the conclusion that was being
11 presented in this document by EMC's competitive
12 intelligence team as of October 2013 that the
13 market for VDI, one of the initial use cases was
14 an insanely crowded market and competition would
15 be fierce(r)?

16 A. Yes, everyone in the market aimed
17 for VDI as their initial use case.

18 Q. Could we turn to page seven of the
19 document.

20 And is this page, Mr. Cobb, a
21 graphic prepared by EMC depicting that insanely
22 crowded market as being described in the report?

23 A. Yes, it is.

24 MR. WERDEGAR: I have no further

1 questions. Thank you.

2 THE WITNESS: You're welcome.

3 THE COURT: Any redirect?

4 REDIRECT EXAMINATION

5 BY MS. DOMINGUEZ:

6 Q. Good morning, Mr. Cobb.

7 A. Good morning.

8 Q. Just now Mr. Werdegarr asked you a
9 series of questions about some concerns about
10 the timing of XtremIO's launch. Do you recall
11 that?

12 A. Yes, I do.

13 Q. And he showed you an email from
14 some marketing folks talking about those
15 concerns; right?

16 A. Right.

17 Q. As best you understand, does any
18 of that have anything to do with whether Pure
19 Storage uses EMC's patented technology?

20 MR. WERDEGAR: Objection.

21 Leading, 701.

22 THE COURT: Overruled.

23 A. Sorry, could you restate the
24 question?

1 Q. As best you understand, does any
2 of what Mr. Werdegarr asked you about have
3 anything to do with whether Pure Storage uses
4 EMC's patented technology?

5 A. No, it does not.

6 Q. Now, by the way, while some folks
7 were obviously pushing as we saw to get XtremIO
8 out into the market as soon as possible. I want
9 to understand what happened after it launched.
10 Could you briefly explain?

11 A. We launched the product in mid
12 November of 2013. We had a very good quarter,
13 in just six weeks of selling, we progressed into
14 2014 and by the middle of 2014 we had gone from
15 entering the market to being number one in the
16 market.

17 Q. What is XtremIO's position in the
18 market today?

19 A. Today it is still number one.

20 Q. Just so I understand, how long did
21 it take for XtremIO to get to that position?

22 A. About three quarters.

23 MS. DOMINGUEZ: Thank you. I have
24 nothing further.

1 THE COURT: All right. Thank you,
2 Mr. Cobb. You may step down.

3 THE WITNESS: Thank you, Your
4 Honor.

5 THE COURT: Mr. Krevitt.

6 MR. KREVITT: Yes, Your Honor.
7 Our next witness is Dr. Kai Li, one of the
8 inventors of the dedupe patent. If I can just
9 step outside.

10 THE COURT: Okay.

11
12 KAI LI,
13 the deponent herein, having first
14 been duly sworn on oath, was
15 examined and testified as follows:

16 MR. KREVITT: We have some
17 binders, Your Honor. May I approach?

18 THE COURT: Yes.

19 MR. KREVITT: May I proceed?

20 THE COURT: Yes.

21 DIRECT EXAMINATION

22 BY MR. KREVITT:

23 Q. Good morning, Dr. Li?

24 A. Good morning.

1 Q. Would you state your full name for
2 the record and introduce yourself to the jury?

3 A. My name is Kai Li. I'm professor
4 at Princeton University.

5 Q. How long have you been a professor
6 at Princeton University?

7 A. I joined the faculty in 1986.
8 Since then I have been faculty member.

9 Q. For the last thirty years?

10 A. Yes.

11 Q. And at some points along the way,
12 did you take any breaks from teaching at
13 Princeton University?

14 A. Yes. At the university, typically
15 we are allowed to have sabbatical every six
16 years. So I took a several sabbatical during
17 this period of time.

18 Q. And we'll talk about one in a
19 little bit. If I can ask you to turn to in the
20 binder that I have provided, Dr. Li, to what's
21 marked PTX-1.

22 MR. KREVITT: And Your Honor, if
23 we could introduce this into evidence, it's the
24 patent.

1 THE COURT: Right. Admitted
2 without objection.

3 BY MR. KREVITT:

4 Q. Do you recognize what's been
5 marked as -- if we could go to the next page.
6 Maybe highlight that part.

7 Do you recognize this document?

8 A. Yes.

9 Q. What is it?

10 A. That's a patent we awarded when I
11 was working at a startup called Data Domain.

12 Q. And it says Kai Li there. Is that
13 you?

14 A. Yes, that's me.

15 Q. And this is the '464 patent?

16 A. Okay.

17 Q. And you understand that the '464
18 patent is one of the patents that's at issue in
19 this case?

20 A. Yes, I understand.

21 Q. And if you would flip to PTX 3,
22 it's the '015 patent?

23 MR. KREVITT: Your Honor, if we
24 could have that introduced into evidence.

1 THE COURT: Admitted without
2 objection.

3 MR. KREVITT: Thank you, Your
4 Honor.

5 BY MR. KREVITT:

6 Q. If you could just make sure,
7 Dr. Li, that you recognize this document as the
8 '015 patent, the second patent at issue in this
9 case?

10 A. Yes.

11 Q. And it says Kai Li, that's you?

12 A. Yes.

13 Q. As one of the inventors.

14 Now, I think you touched on this a
15 moment ago, but the patent, if you go down a
16 little bit says that Data Domain is the
17 assignee?

18 A. Yes.

19 Q. And you had mentioned earlier that
20 you were working at Data Domain when you took a
21 sabbatical. When was that?

22 A. That was in 2001, when I was on
23 sabbatical at Stanford University, and then I
24 team up with two cofounders to start this

1 company.

2 Q. And let's just break that down for
3 smaller pieces if we can. So the year was 2001,
4 I think you mentioned Stanford, I hadn't heard
5 anything about Stanford yet. Can you explain to
6 the jury what you were doing at Stanford?

7 A. Initially I was on sabbatical at
8 Stanford University. And during sabbatical
9 typically we're supposed to take some time off,
10 perhaps learn something new so we can return
11 back to the university to start a new research
12 program.

13 During that period of time, I was
14 -- I met some friends who were interested in
15 doing, asking me to help them with their
16 startups, then I thought if I have time to do
17 that, perhaps I should think about doing a
18 startup myself, that's when I team up with the
19 two other cofounders to start Data Domain.

20 So we start the company October
21 12th, 2001, which is one month after September
22 11th.

23 Q. And we'll talk more about Data
24 Domain, but just briefly, sir, did Data Domain

1 make products?

2 A. Yes, Data Domain make what we
3 currently call deduplication storage system
4 products to protect data. Especially with
5 focusing on backup data.

6 Q. And just to be clear, you said
7 what we currently called, did the Data Domain
8 product have a different name earlier when you
9 had launched it?

10 A. Yes. I think the first product we
11 call it is a, I think we changed a thousand
12 times, we called restorer, meaning that you can
13 restore data very quickly. We also called that,
14 I think internally we called -- today we call
15 deduplication, but back then we called global
16 compression. I think a few years later market
17 research firms start talking about this new
18 market segment. They coined the name
19 deduplication, then Data Domain follow that
20 term. We thought it was a good terminology.

21 Q. And did all of Data Domain's
22 products use deduplication?

23 A. Yes. The entire product line use
24 deduplication.

1 Q. And how important was
2 deduplication to Data Domain and its products?

3 A. That's the key technology for Data
4 Domain product.

5 Q. Now, I probably should have asked
6 this earlier, but just for the jury's benefit,
7 can you give your, at a high level, your
8 understanding of what deduplication is? When
9 you talk about deduplication, what do you mean?

10 A. Right. Deduplication is a method
11 to identify duplicate data segments and then in
12 order to store unique segments, such that you
13 can reduce the footprint of the storage
14 dramatically. In the past if you're using
15 typical compression tools on your laptop or
16 desktop computer, they also identified duplicate
17 data, except in a very small window, such as a
18 hundred kilobytes or so. Back then when we call
19 global compression or today we call
20 deduplication is to make that window very large
21 that in the entire storage system or the network
22 of storage systems, you can find duplicate data,
23 so you can avoid storing them, now you can find
24 a lot more duplicate data. I think that's what

1 we refer to as deduplication today.

2 Q. How does deduplication relate to
3 the patents that are at issue in the case, the
4 patents that you just looked at?

5 A. I think to build a deduplication
6 storage system, there are many challenges. So
7 to solve this problem, to be able to build a
8 commercial product that works well, you have to
9 have innovations. I think those innovations
10 represents some parts of the deduplication
11 technology.

12 Q. You mean the innovations?

13 A. The innovation.

14 Q. That you developed at Data Domain?

15 A. Yes.

16 Q. And do all of the products that
17 Data Domain sell incorporate the technology in
18 the patents that we're talking about?

19 A. Yes.

20 Q. Let's take a step back. We jumped
21 into deduplication quicker than I anticipated
22 and just get a sense of who you are. Where did
23 you grow up?

24 A. I was born and grew up in China.

1 Q. Where in China?

2 A. In the city called Chongqing, we
3 call Manchuria in the US. It was the capitol of
4 the country during World War II.

5 Q. And you went to college in China?

6 A. Yes, I went to university called
7 Jiaotong University in the same province where I
8 grew up. That university is a public school,
9 large public school, sort of similar, if I used
10 the analogy, it would be similar to University
11 of Illinois, University of Wisconsin.

12 Q. And after your time in college,
13 did you have further studies in China?

14 A. Yes. I went to Chinese Academy of
15 Science for my master degree during which time I
16 applied to the PhD programs in the US, then in
17 1981 I went to Yale University for my PhD study.

18 Q. After your studies in China you
19 went to Yale for your PhD studies, is that what
20 you said?

21 A. Yes.

22 Q. And that was in, I'm sorry, which
23 year?

24 A. That's 1981.

1 Q. And was that your first time in
2 the United States?

3 A. Yes, that was the first time to
4 the United States, also the first time I got out
5 of China.

6 Q. First time leaving China?

7 A. Yes.

8 Q. What led you to leave China at
9 that time?

10 A. Well, for the better opportunity
11 to study, for better education.

12 Q. And was that common for people in
13 China to come and study in the United States at
14 that time?

15 A. No. That wasn't common. I think
16 this is after the so called revolution, that was
17 the first time the government allows students to
18 get out of China to study.

19 Q. So you go to Yale. It's your
20 first time in the United States. What did you
21 do -- you got a doctorate from Yale?

22 A. Yes.

23 Q. And then what happens after you
24 graduated with your doctorate, what do you do?

1 A. I received my PhD degree in 1986
2 and then I joined Princeton University as a
3 faculty member.

4 Q. And that's in sort of full circle
5 that you've been there ever since?

6 A. Yes.

7 Q. And did you consider going back to
8 China after you got your doctorate at Yale?

9 A. No. I think like many first
10 immigrants, after receiving education in the US,
11 you know, I felt I loved this country. This
12 country gave the best opportunity for my career,
13 also the best environment to create a family, so
14 I stayed.

15 Q. So turning back to the patents,
16 other than the two patents that we've talked
17 about so far, the '015 and the '464 patents that
18 are at issue in this case, are you an inventor
19 on any other patents?

20 A. Yes, I have received numerous
21 patents.

22 Q. Ballpark sense of them?

23 A. More than 20.

24 Q. And other than the patents that

1 you received, have you received other awards in
2 your industry or other honors?

3 A. Yeah. Yes, numerous awards.

4 Q. You're going to be modest with me.
5 Can you give the jury an example or two of the
6 honors and awards that you've received in your
7 career?

8 A. Yeah, probably the most
9 prestigious one I was elected to National
10 Academy of Engineering in 2012. And before that
11 I was elected to IEEE and IEEE fellow and after
12 that I was elected to be ACM fellow. Those are
13 recognitions for the work I've done in the past.

14 Q. Okay. So let's take a step back
15 now to the founding of Data Domain. I think you
16 said that was in October of 2001?

17 A. Yes.

18 Q. Okay. So let's go back to that
19 time. And you said that you had some
20 co-founders?

21 A. Yes.

22 Q. Can you explain briefly who your
23 co-founders were and how quickly you came
24 together and formed Data Domain?

1 A. Yes. One of the co-founders, Ben
2 Zhu, who I met several years before 2001,
3 because he was a graduate student at Stanford
4 University and his advisor, Pat Hyrahan was a
5 friend of mine. And we -- it happened also he
6 was a roommate of Larry Page, who is now the --
7 who is one of the founders of Google. So in
8 2001, I first met him through the potential
9 investor of one of the venture capitol first.
10 And once we met we recognized we had already met
11 before, so he wanted to work with me to start a
12 new company. Another person is Brian Biles. He
13 has expertise in product management. And he
14 was -- his company was just fired so he was
15 looking for an opportunity with other people to
16 start up a company.

17 So the three of us, once we met,
18 we sort of really enjoyed being together, and we
19 spend more time every day. Eventually we
20 decided to start a company.

21 Q. And during all of this time you
22 remain a professor at Princeton?

23 A. That was during my is sabbatical.
24 During sabbatical the university actually pay

1 your salary because for you to learn something
2 new. But when I knew I was about -- was
3 thinking about doing a start up, I actually
4 informed the university stop paying my salary,
5 so -- to avoid potential conflict of interest
6 and I would -- so I was on no pay leave from the
7 university.

8 Q. So explain for the jury when you
9 and your founders come together what the mission
10 of Data Domain was. What was the purpose you
11 all set out to pursue?

12 A. Our mission was to replace tape
13 library data centers. The reason we were
14 thinking about doing that, because at the time
15 as many of you probably remember, the music
16 cassette tapes were replaced by MP3 players and
17 ipods. And VHS videotapes were being replaced
18 by DVR and TiVo's at the time. So tapes were
19 very difficult to use and people at the data
20 center had the similar problem, but no one was
21 able to build a product to replace them, so we
22 thought that would be a good opportunity for us
23 to build some product to replace tape library in
24 data centers.

1 Q. If tape library weren't great, you
2 wanted to replace them, why were they so widely
3 used?

4 A. Well, tape media, as many of you
5 know, are inexpensive comparing with magnetic
6 disk drives, so people, they produce a lot of
7 backup data, because typical data center you do
8 a back up every day, the incremental back up,
9 back up all the files have been changed, but on
10 a weekly basis typically you do a full back up,
11 back up the whole data, all the data you have in
12 the server, and so that consume a lot of media,
13 and tapes are inexpensive, therefore data
14 centers would prefer using tapes. Another
15 reason is to move tape to the this side for
16 disaster recovery like earthquake or something
17 like September 11 so you can get your data back
18 and they have been using this for this way for
19 decades, so -- but you have problem, many
20 problems, for example, you want to find the
21 data, you have to find the tape first, and you
22 also need to rewind the tape to find where the
23 data is.

24 Tape media are also not so

1 reliable. Sometimes when we write data into it,
2 by the time you read the data, you may not be
3 able to read it back reliably.

4 So we have Data Domain recruit
5 some people from Erta Mountain, that's the
6 largest company for remote data transfer, and
7 they told us that often they cannot find
8 customers' tape because the tape placement are
9 based on bar code and human produce errors.
10 Their statistics is that about ten percent of
11 the time they couldn't find the tapes. So there
12 is a lot of issues with tape.

13 Q. Just so I understand, and the jury
14 understands that you described some quality
15 issues with tape, but at the end, you said that
16 it also gets lost. And you say that a company
17 that stores that told you that ten percent of
18 the time, tape just can't be found?

19 A. Yes. Also, I think in early 2000,
20 California passed a law saying that any -- if
21 you are a company and if you lose data of
22 California residents, you have to provide that
23 information to the public domain, disclose that
24 information. So, therefore, since year -- since

1 that time, we saw a lot of article about, Bank
2 of America lost 600,000 customer information
3 during the backup data transfer.

4 When they transfer tape, sometimes
5 they just lost, they couldn't find, and that
6 information would be exposed, it's compromised.

7 Q. So with the significant problems
8 associated with tape that you explained to the
9 jury and disks existed, why in the backup
10 storage that you were focused on didn't everyone
11 just use disks?

12 A. Right. First of all, disks,
13 magnetic disk drives always cost a lot more than
14 tape by several factor, like around factor of
15 five at the time. So you would have to make
16 that decision, if you just used the
17 straightforward way to store data on disks, it
18 would cost data center, an increase of the cost
19 dramatically.

20 In order to compete, similar to
21 iPod or DVR players, you would have to have
22 special compression to shrink the footprint such
23 that using disk space as storage would be
24 competitive in price, but better in many other

1 -- you have other good, so that's the challenge.
2 You have to be able the create a new kind of a
3 compression that can dramatically shrink the
4 data footprint in order to have disk replace
5 tape, that's what we set out to do as a startup
6 company.

7 Q. That's what Data Domain set out to
8 do to replace tape with disks?

9 A. Right.

10 Q. And what were those -- you start
11 in October of 2001, what were those first months
12 like if you could explain to the jury, what was
13 that like being in that startup for you?

14 A. Well, I think life in startup,
15 it's always exciting, but very time consuming.
16 We were just very busy working. And typically
17 we worked fourteen hours a day and the weekends.
18 And we worked in that way for a long time.

19 Q. And did Data Domain, did you and
20 your colleagues find a solution to the problem
21 to be able to move from tape to disk?

22 A. Yes. I think a few months after
23 we start a company, we came up with the idea, I
24 think today people called it deduplication

1 storage technology, and based on that we start
2 building our product line.

3 Q. And did Data Domain succeed in
4 developing the deduplication technology, the new
5 deduplication technology to be able to move from
6 tape to disk?

7 A. Yes. We were able to do that.
8 And I think in 2006, Data Domain product line
9 revenue exceeded the tape revenue, that means we
10 won the war on replacing tape.

11 Q. Let's just follow-up on that.
12 When did the first Data Domain product launch?

13 A. It was in 2004.

14 Q. 2004. And within a year or say,
15 what market share did Data Domain have?

16 A. Well, initially I think people
17 were not -- there was no deduplication storage
18 product segment. Data Domain was the company
19 that introduced the deduplication storage
20 product into the marketplace.

21 I think the first year we had a
22 revenue of 8 million, and then quickly increased
23 to 40 million, then over a hundred million, then
24 200 and 500, and then over a billion in revenue.

1 Q. So for us, we don't get to a
2 billion so quickly, so if we could slow that
3 down. So you said you were at 8 million?

4 A. Right.

5 Q. Was that the first year after
6 launch?

7 A. Right.

8 Q. You can explain it, but maybe if
9 you slow it down and just give the jury a sense
10 of the timing of how you got to, I think you
11 said 40 million or whatever the right numbers
12 are, if we could explain to the jury what the
13 trajectory is to get to that revenue for the
14 Data Domain products?

15 A. I'm not sure what you meant.

16 Q. I'm not either.

17 So I just want -- you gave several
18 numbers, and so that just so the record is
19 clear, the first year of Data Domain revenue was
20 about \$8 million?

21 A. Yes.

22 Q. And the second year of revenue?

23 A. It was -- the second after that I
24 think was over 20 million, if my memory is

1 correct, it was around 27 million. And then it
2 went to 46 million.

3 Q. The next year?

4 A. Yeah. And then to 127 million.
5 Then to I believe after that was the year -- so
6 that was at 250 million, and then 570.

7 Q. Do you remember what year was 250
8 million?

9 A. That was 2006.

10 Q. So just a couple of years after
11 launching the product?

12 A. Yeah. Uh-huh.

13 Q. And then it doubled to 500
14 million?

15 A. No, I'm sorry. I need to get
16 back, take it back. I think the year of 2007
17 was 127, that was the year we went public. The
18 year after that is 250. Then in 2009 was 570,
19 that was the year EMC acquired Data Domain.

20 Q. And then when did it go to a
21 billion dollars in revenue?

22 A. The year after that acquisition,
23 2010 it went to 1.1 billion.

24 Q. Do you know how the revenue of the

1 Data Domain product has continued since then?

2 A. Yes. The year after that, it was
3 one point -- over 1.5 billion, then 1.8 billion,
4 then over two billion for the rest of the years.
5 So in total Data Domain product line has
6 generated over ten billion revenue. And the
7 gross margin is around over 75 percent. I think
8 the last two years was over 80 percent. I think
9 EMC is charging too much money, but --

10 Q. Objection.

11 A. I wish it was a little lower.

12 Q. And just for the benefit of
13 everybody here, what do you mean when you say
14 gross margins in that context?

15 A. Gross margin is the -- let's say
16 you have a hundred dollars of revenue, then the
17 cost of making the product is 25 percent. Then
18 the cost is \$25. And the 75 -- in this case,
19 gross margin is 75 percent.

20 Q. And just following this through,
21 do you have a sense of what Data Domain's market
22 share was in those years?

23 A. I think since the market research
24 community defined the segment of deduplication

1 storage, Data Domain product line, has always
2 had more than 60 percent of the market share.

3 Q. 60 percent?

4 A. 60 percent, yeah.

5 Q. And those revenues are all
6 attributable to the Data Domain deduplication
7 products?

8 A. Yes.

9 Q. And all of those products
10 incorporate the '015 and '464 patents we have
11 been talking about?

12 A. Yes.

13 Q. So let's get back to deduplication
14 and you're working fourteen hour days on the
15 startup in the early months, and how quickly did
16 you and your founders, your colleagues develop
17 the idea to use deduplication?

18 A. I think -- the complete set of
19 ideas or the technology, or invention, whatever
20 you call it, that we had altogether was in
21 February 2002.

22 Q. So from October to February,
23 October 0 one to February 2002?

24 A. Yes.

1 Q. Let me ask you a question if we
2 step back. Did you, Dr. Li, invent
3 deduplication, the concept of deduplication?

4 A. Well, I would say no, because
5 deduplication, the concept, has been around
6 since we start doing compression, back in the
7 '70s. Because if you run those compression
8 tools, they're trying to identify and duplicate
9 data, so you call that deduplication, then that
10 concept has been around for a long time.

11 I think what we have is how to
12 build deduplication storage system, that was
13 new, that was new at the time.

14 Q. And is that what you invented and
15 put in your patents?

16 A. Yes. I think the aspect -- yeah,
17 in this patent, in the two patents, I think what
18 we have is how to build a disk storage system
19 that can run fast and that can achieve low cost,
20 and that's how we can use the product to replace
21 tape backup.

22 Q. And you developed new and specific
23 techniques to use deduplication in order to
24 accomplish that move from tape to disk?

1 A. I wouldn't say use, I would say we
2 invent new ways to implement or to make
3 deduplication storage part.

4 Q. Can you just at a very high level
5 describe what those -- what you understood to be
6 your new techniques and new inventions? If I
7 may, I know the patent sets out your invention,
8 I'm not asking you to read your patent, but for
9 the jury, at the highest level, what you
10 understood you had come up with?

11 A. Yes. So the challenge of building
12 deduplication storage system to replace tape is
13 that I think I'm trying to simplify the
14 description.

15 So one thing you have to
16 accomplish is that to reduce the cost, as I
17 mentioned before, disk, magnetic disk media
18 typically cost several times more expensive than
19 tapes. So we have to shrink data footprint, we
20 have to have a compression ratio much higher
21 than the cost factor.

22 Let's say it cost more than a
23 factor, cost more than factor of five comparing
24 with tape library, and the compression ratio has

1 to be greater than five in order to break even.
2 So we want to achieve very high compression
3 ratio.

4 The other thing is there is also
5 another cost in it which is you need to have a
6 server inside a storage box in order to perform
7 the compression, so that cost has to be reduced,
8 too, in the same formula. I think the most
9 technical challenge is the speed of moving data.
10 The reason is that every day when we back up
11 data, data center only has a few hours, for
12 example from midnight to four o'clock in the
13 morning, four hours, and this is a time you
14 don't have users.

15 But the data growth rate is very
16 high. The data keeps growing. Actually the
17 data growth rate, we call it the Moore Curve,
18 Gordon Moore, Intel founder, predicted that the
19 network transistors on various chips would
20 double every eighteen months or so, so then in
21 the industry, we called that Moore Law. We
22 applied Moore Law to data growth rate to CPU
23 performance to many, many things.

24 So that basically means that the

1 data grows by a factor of ten every five years.

2 So that means that you know, if we
3 only have four hours to move data to back up
4 devices, our through put has to increase by a
5 factor of ten every five years. So that's one
6 of the challenges.

7 But meanwhile you want to reduce
8 costs, therefore you can't use expensive storage
9 to test whether which data is redundant, so you
10 have to use very little other resources, such as
11 DRAM to hold information in order to test.
12 Without looking at data restored in data media
13 to decide which piece of data you already have
14 or currently you have the same data, so you can
15 identify which data is redundant.

16 So this, I think this one of the
17 patents, probably the '015 Patent talk about how
18 to use a data structure, very compact structure
19 and how to, describe the algorithm, how to use
20 that method to decide which data is duplicate
21 and which one is not duplicate, then we can
22 achieve the compression. So in the end, I think
23 we typically can get compression ratio by a
24 factor of 20 to 30, because in back up in the

1 entire storage there's a lot of redundant data
2 we can find. That is -- that's how we can build
3 product, so this process is difficult because of
4 what I described.

5 Q. The inventions that you and your
6 colleagues came up with and put in the '015 and
7 '464 Patent solve those issues?

8 A. Yes, we proved that we solve the
9 issues by shipping those products and customers,
10 users have seen what the products can do.

11 Q. You're referring to the revenue,
12 the fact that there were so many sales of the
13 products?

14 A. Not only the revenue, but also we
15 have the auto support data coming back from the
16 customer showing us what compression ratio they
17 achieve.

18 Q. And you use the term compression
19 numerous times. I believe in this context
20 you're using compression to mean deduplication;
21 is that right?

22 A. Well, deduplication -- the
23 definition of deduplication is a little vague,
24 because in our product in addition to

1 identifying which data segments are redundant,
2 we also apply the so-called local compression on
3 the unique segments before we store it to the
4 data. So it's a combined approach and when we
5 say compression ratio, total compression ratio,
6 we mean the compound of the compression of
7 deduplication and local compression together.

8 Q. And when you said you achieved 20
9 to 30 X?

10 A. Yes.

11 Q. What do you mean by that?

12 A. That means that if I have 20
13 megabytes of data, then I only need to consume 1
14 megabytes of storage.

15 Q. You reduced the data by that much?

16 A. By that factor, yeah.

17 Q. So let me ask you a few questions
18 about when you came up with the ideas that you
19 and your colleagues put in the patents, in the
20 '015 and the '464 patents. Do you remember with
21 precision a date by which you had conceived of,
22 thought of the ideas that you put in your
23 patents?

24 A. Yeah. With my co-founder Ben Zhu,

1 we had a lot of discussions. This is before,
2 before we start recruiting other people. I
3 think -- on the day we put all the ideas
4 together that we understood how to make such
5 product was in February. The reason we remember
6 it was in February, was that we -- I wrote a lot
7 of discussions on a white board and we had a
8 tradition of taking white board, using digital
9 camera to take white board shots as a record of
10 our discussion. I had a digital camera at the
11 time that -- you know, cell phones didn't have
12 cameras at the time, so when I was told that
13 there was a patent litigation going on I
14 immediately, you know, remembered I had those
15 white board shots, so I found those. Those were
16 taken in February. In fact, these screen -- the
17 first screenshot at the time I named the file
18 February 13, 2002. We also remember -- I
19 remember that Hugo Patterson, who was the
20 co-inventor of the patent, he joined Data Domain
21 within a week after he received his offer
22 letter. I found his offer letter dated February
23 25 the of 2002. Then another person --

24 MR. VAN NEST: Objection, Your

1 Honor. Move to strike.

2 THE COURT: All right. The last
3 sentence, Mr. Krevitt, you agree, right?

4 MR. KREVITT: I don't -- I don't
5 necessarily.

6 THE COURT: All right. Come over
7 to side bar.

8 (Side bar discussion.)

9 THE COURT: So he referred to
10 finding the offer letter, which I think is one
11 of the documents that I struck, right?

12 MR. KREVITT: I confess I don't
13 know -- I didn't think it was, but it may well
14 have been. I would need to find out.

15 MR. VAN NEST: It is.

16 MR. KREVITT: Or I can take his
17 representation.

18 MR. VAN NEST: It's stricken.

19 MR. KREVITT: You struck the
20 document, but if he has an independent
21 recollection of it --

22 THE COURT: How could he possibly?

23 MR. KREVITT: I think he
24 absolutely does.

1 THE COURT: He just said I found
2 the letter or saw the letter.

3 MR. KREVITT: Can I ask that
4 question, aside from the letter -- in other
5 words --

6 THE COURT: It's actually just not
7 plausible that he remembers the date of a letter
8 when we know he saw the letter.

9 MR. KREVITT: I don't mean that.
10 I mean by when Mr. Patterson joined the company.

11 THE COURT: You can ask him that,
12 you've said that all along.

13 MR. KREVITT: Okay.

14 MR. VAN NEST: We're going to
15 instruct the jury that this reference to the
16 offer letter and the date will be stricken?

17 THE COURT: Right.

18 MR. VAN NEST: Yeah, okay.

19 THE COURT: Okay.

20 MR. VAN NEST: He can talk about
21 if he remembers when Patterson joined as long as
22 it's separate from the offer letter.

23 MR. KREVITT: I don't know that it
24 instruction is necessary, Your Honor, at this

1 time.

2 THE COURT: Well, I mean, he's
3 referred to something I struck, so I'm going to
4 give -- tell them, actually, I think -- you
5 know.

6 MR. KREVITT: I actually didn't
7 expect the witness to refer to the offer letter,
8 that's why I didn't look back to -- just one
9 thing. I just wouldn't -- so he volunteered it,
10 and I am concerned that there is going to be an
11 instruction that makes it seem like we did
12 something that we shouldn't be doing, when --

13 THE COURT: You know, I'm not
14 concerned with why they think it was struck.
15 I'm concerned what kind of follow up question
16 you think you can ask that won't --

17 MR. VAN NEST: Evoke this.

18 THE COURT: Yeah, something like
19 that.

20 MR. KREVITT: Why can't I ask
21 explicitly, independent of any letter,
22 correspondence, just from your own memory and
23 recollection?

24 MR. VAN NEST: Your Honor, if you

1 struck the question and answer, which I think
2 you're intending to do --

3 THE COURT: The problem is the
4 answer was sort of narrow which he was doing a
5 bunch of things. The question was fine. I
6 think.

7 MR. KREVITT: I did not refer to a
8 letter, I can assure you of that.

9 MR. VAN NEST: So, I'm concerned
10 that just about any question about when Mr.
11 Patterson started, given that he's now reviewed
12 the letter and now reread it, to give him the
13 date is going to be tainted by that. So I'm not
14 sure what question he could ask that would be
15 appropriate.

16 THE COURT: And that's kind of my
17 concern is you can't actually -- I mean, if you
18 ask him do you remember when Mr. Patterson
19 started, he'd probably say, yeah, it was about a
20 week after February 23rd or whatever date of
21 that letter he just said. So in terms of
22 verifying or corroborating go his testimony, I
23 don't know how him saying well, Mr. Patterson
24 started when, actually he's going to do that

1 anyhow. So why don't we just skip that?

2 MR. KREVITT: I can tell you if
3 you're interested.

4 THE COURT: Okay. Tell me.

5 MR. KREVITT: This is what he's
6 told us. We ask him how do you know that you
7 came up with your ideas by a certain date? One
8 of the things he said from the start, I
9 understand he found documents later, was that he
10 had done these white board drawings before Mr.
11 Patterson started. That's how I can situate
12 them in time.

13 THE COURT: But when you're asking
14 the white board date, I thought the white board
15 drawings had some kind of date that was
16 associated with them.

17 MR. VAN NEST: One does.

18 MR. KREVITT: They all do.

19 THE COURT: So that saying I
20 know -- so the point is when trying to get some
21 kind of corroboration of what he's saying --

22 MR. KREVITT: We'll move on. I'll
23 move on.

24 THE COURT: Okay.

1 THE COURT: All right. Members of
2 the jury, Dr. Li, actually I'm just going to
3 strike his entire answer to the last question,
4 so I'm going to ask you to disregard it. I
5 would ask Mr. Krevitt to try to ask another
6 question. All right.

7 BY MR. KREVITT:

8 Q. So I want to go back to how you
9 know that you conceived of your inventions in
10 the February time frame, and you were talking
11 about your whiteboard photos.

12 A. Yes.

13 Q. I want to ask you some follow-up
14 questions about that. And I'm not interested in
15 how they may have related to other people
16 joining the company, I just want to understand
17 your understanding of the whiteboard photos and
18 why they're relevant to you in terms of when you
19 conceived of all the ideas that are in your
20 patent. So let's -- why don't we start there.

21 You were talking about these
22 whiteboard photos that you prepared. How did
23 those whiteboard photos, drawings, confirm for
24 you that you had conceived of your inventions in

1 that time period?

2 A. Well, the whiteboard photos is
3 important because that white board discussion --
4 we actually left the whiteboard writing for
5 quite a while because that captured the key
6 inventions that eventually went into the patent.

7 Q. Why don't we look at, start
8 looking at the whiteboard photographs. And why
9 don't we pull up -- I think you had said that
10 one file name was mid-February; is that right?

11 A. Yeah.

12 Q. Let's pull up PTX 9. And can you
13 tell the jury, it's obviously hard for us all to
14 read, but can you tell the jury what we're
15 looking at?

16 A. Right. So I think this is in the
17 upper left corner it talks about the cache
18 container of a table which described cache table
19 size and also what are the procedures needed to
20 access this data structure.

21 Then following that is a map
22 showing how to identify using a summary data
23 structure to identify which -- what data is new,
24 what data segments are duplicates.

1 Then there is a big table, that's
2 the entire table that has all the information
3 that's in the middle called global hash table.
4 This described the data structure as well as how
5 to access them, as well as how to even make an
6 update, how to achieve high performance.

7 You can see there is also some
8 parameters, and also on the right-hand side
9 there is some configuration how to build, what
10 parameters we are thinking about using, what we
11 estimated how the performance of such a data
12 structure.

13 So many of the data structure,
14 even the parameters are still used in the
15 current product line.

16 Q. Does this whiteboard photograph
17 confirm that at the time that you prepared the
18 actual drawings, you had conceived of all the
19 inventions that are in the claims that we're
20 talking about in the '015 and the '464 patent?

21 MR. VAN NEST: Objection, Your
22 Honor. Leading.

23 THE COURT: I would ask that you
24 rephrase the question, Mr. Krevitt.

1 BY MR. KREVITT:

2 Q. What does this photograph tell you
3 about the relationship of when you prepared this
4 whiteboard drawing to when you had conceived of
5 all the ideas in the claims of the '015 and '464
6 patent?

7 A. The invention that happened is
8 essentially from this drawing.

9 Q. Does that mean that you had
10 conceived of the ideas at the time this was
11 prepared?

12 A. Yes.

13 Q. And you said that you took
14 photographs of the whiteboard; is that right?

15 A. Yes.

16 Q. And are you familiar with the
17 concept of metadata?

18 A. Yes. Those are the description of
19 about when, how, and information about the
20 photos created by the camera.

21 Q. Created by the?

22 A. By the camera.

23 Q. The photograph that was taken of
24 this whiteboard, who took it?

1 A. I took it.

2 Q. If we could pull up the metadata.

3 Is this the metadata that you referred to that
4 describes when the photograph was taken and how?

5 A. Yes.

6 Q. And what is the date that is
7 identified as the date that the photograph of
8 the whiteboard that has your invention was
9 taken?

10 A. Well, the date here is February
11 27th, 2002. The name of the file, I gave was
12 February 3th, 2002. I think I named the file
13 because that was the date of the writing on the
14 board. I believe that February 27 was the day I
15 took the photo.

16 Q. So just make -- you named the file
17 that you put the photograph in February 13?

18 A. Yeah. This particular file, I
19 named February 13.

20 Q. And you think that's because
21 that's the date you actually did the drawings?

22 A. Yes.

23 Q. But this date, February 27th,
24 that's the date that you then take the

1 photograph of the drawings?

2 A. Yes.

3 Q. If we turn to PTX 10. I'm not
4 going to ask you to describe everything on the
5 whiteboard, Dr. Li. But is this another --
6 maybe if you could just tell the jury what this
7 is?

8 A. Yes. This is a, part of the
9 architecture design to implement the invention
10 into a product. This is a COS, means compress
11 object store.

12 Q. And so does this also confirm that
13 you had conceived of your inventions by the time
14 you did this drawing?

15 A. Yes.

16 Q. And why don't we look at the
17 metadata for this photograph, again, which is
18 the date the picture was taken. Can you tell us
19 what the date of the picture?

20 A. That's March 20th, 2002.

21 Q. March 20, 2002.

22 That means that the photograph was
23 taken on that date?

24 A. Right.

1 Q. Does that mean that you did the
2 drawings on that date?

3 A. No. That means that the drawing
4 has to be done before the photo was taken.

5 Q. So no later than that date, maybe
6 earlier?

7 A. No later than that date.

8 Q. And if we flip to just one more,
9 PTX 11, and again, not asking you to go through
10 in detail, but does this whiteboard like the
11 others relate to the deduplication inventions in
12 your patent, your patents, excuse me?

13 A. Yes. This one is to describe the
14 function of, particularly the future and also
15 the analysis of how many bits you need per
16 entry, so we did some contemplation on the
17 whiteboard. This is my handwriting.

18 Q. Are all the white boards your
19 handwriting?

20 A. Yes.

21 Q. Let's just look at the metadata
22 for completeness on this one. What is the date
23 of this one?

24 A. This is also March 20, 2002.

1 Q. Do you remember taking the
2 photographs?

3 A. Yes, it was my digital camera. I
4 don't have it in the office, but once in a while
5 I bring the camera in, I would take photos as a
6 record.

7 Q. And why did you take the photos?

8 A. Well, it's a more efficient way to
9 archive the discussions. And also later we
10 could use to remind ourselves what we had
11 discussed before.

12 MR. KREVITT: Your Honor, we move
13 PTX 9, 10 and 11 into evidence.

14 MR. VAN NEST: No objection, Your
15 Honor.

16 THE COURT: All right. Admitted
17 without objection.

18 BY MR. KREVITT:

19 Q. Let me show you another document,
20 Dr. Li, or ask you to flip to in your binder.
21 It's PTX 8. So it comes right before the
22 whiteboard photos we were just looking at.

23 A. Yes.

24 Q. Do you recognize this document?

1 A. Yes, I do. I wrote this document.

2 Q. And what is an architectural
3 specification?

4 A. Architectural specification is the
5 document describing the product architecture,
6 and also document the technology used in the
7 product.

8 Q. And was the architectural
9 specification we're looking at here, does that
10 reflect your inventions and indicate that you
11 had conceived of your inventions by the time you
12 wrote the architectural specification?

13 A. Yes. The standard practice we
14 develop a technology and we want to use the
15 technology in the product, we will write a
16 specification. In fact, we'll write two
17 specifications, one is the architectural
18 specification, the other is a functional
19 specification, based on both of the engineers
20 would be able to implement that particular
21 design.

22 But in this case, this is a global
23 design, the top design. Then the product will
24 be divided into modules, then for each module,

1 we'll have to write an architectural
2 specification and the functional specification
3 so you know what to implement, how to implement
4 and also what to test later, that way you put
5 everything together and it will work.

6 This one is essentially follow the
7 whiteboard discussion document, what ideas would
8 go into -- based on your discussion would go
9 into the product.

10 Q. Were those the same ideas that you
11 conceived that went into the patents?

12 A. Right. Yes.

13 Q. And would you sit down to write an
14 architectural specification before you had
15 conceived of your inventions that you put in
16 your patents?

17 A. No. You can't write a
18 specification without the invention. You have
19 to have the invention in place before you write
20 a specification. In fact, in many cases, this
21 is not just Data Domain, but standard practice
22 in most of the companies. You need to validate
23 your ideas by either using mathematics or by
24 implementing prototype and work with running

1 with workload before you start writing
2 specification, otherwise it will be a waste of
3 time.

4 Q. There are two dates on this
5 architectural specification, March 16, 2002 and
6 April 3, 2002?

7 A. Right.

8 Q. Can you explain what those dates
9 mean?

10 A. Well, in this case, March 16, 2002
11 was the first draft. Then that was named the
12 version 0.1. 0.1 one is this particular
13 version, that's the vision, and released in
14 April, on April 3rd, 2002.

15 Q. And did you look for the March 16
16 document?

17 A. I couldn't find that document. I
18 did look.

19 Q. And are you able to say how
20 significant or what the nature of any changes
21 may have been between the March 16 document and
22 the April 3rd document?

23 A. Well, based on the -- our
24 convention, versioning convention, the change is

1 minor. The reason is that typically before the
2 dot, that mark the main version, but in this
3 case we're using zero as the first draft. In
4 some cases, I think -- in some companies
5 typically you use 1 as the first draft. In this
6 case that's the main version, then the digit
7 after the dot is the -- are the changes since
8 the first version. Then the second digit after
9 that is a minor change. That's our convention.
10 I'm pretty sure it's minor changes since then.
11 Also -- what described in this document are what
12 I described in the white board -- the screen
13 shots.

14 Q. In the white board photographs?

15 A. Yes. So I'm certain that the
16 version March 16 document, the idea is white
17 boards too.

18 Q. So just to be clear, what you're
19 saying, are you absolutely certain based on the
20 white board photos and this document and just
21 your own recollection that by March 16 you had
22 conceived of all the inventions in the claims in
23 the patent in this case?

24 A. Yes.

1 Q. Now, after you conceived of the
2 inventions and you created the March 16
3 architectural specification, what did the
4 company focus on next?

5 A. The company, we -- on several
6 things in parallel. One is to immediately build
7 a prototype, based on the invention and we
8 convinced three data centers to run -- their
9 work load. Actually we deployed the prototype
10 into three data centers. Then meanwhile we're
11 designing the rest of the pieces, right, then
12 build a purer version 1 of the product. So we
13 were very busy working on those.

14 Q. What was that time like for you in
15 those months after you conceived of the
16 invention or were working hard?

17 A. Yeah, just extremely busy. I
18 think -- I think after that, after working very
19 hard to build the product line and developing
20 the market and so on and so forth, looking back
21 was very interesting, but at the time it was
22 very difficult for most people, just because
23 we -- we worked very hard. As I mentioned
24 before, we typically worked 14 hours a day.

1 Q. And was that for months on end?

2 A. No. No. For the first two or
3 three years, I think we were working like that.

4 Q. And if I can ask you --

5 MR. KREVITT: First, Your Honor,
6 if I can move into evidence PTX-8, the
7 architectural specification.

8 MR. VAN NEST: No objection, Your
9 Honor.

10 THE COURT: Admitted without
11 objection.

12 BY MR. KREVITT:

13 Q. And if you could look, Doctor Li,
14 and I'm going to speed it along, if you could
15 look through, I'm going to give you some
16 numbers, 49 and 50.

17 A. Where are you looking at?

18 Q. They should be in your binder.

19 A. 49. Oh, in the back.

20 Q. I'm sorry, yes.

21 A. Okay. Yes.

22 Q. I'm not going to ask you specific
23 questions about these documents, but I do want
24 to make sure -- I just want to ask you what they

1 are, so 49, 50, 51, 55, 57.

2 A. Right.

3 Q. 59 and 62.

4 A. Yes.

5 Q. 63 and 65. And then 66, 67 and
6 68. And if you could just tell me if you
7 recognize these documents?

8 A. Yes, I recognize them.

9 Q. And what are they, just again?

10 A. These are the architectural and
11 the functional specification I mentioned before
12 for each main module in the product.

13 Q. And those documents that have
14 dates ranging from May of 2002 to December of
15 2002, does that refresh your recollection as to
16 the time frame within which you were working
17 that hard to build your product?

18 A. Yes.

19 MR. KREVITT: Your Honor, I would
20 move to have those, all of those documents
21 admitted into evidence, please.

22 MR. VAN NEST: No objection, Your
23 Honor.

24 THE COURT: All right. All

1 admitted without objection.

2 BY MR. KREVITT:

3 Q. Now, finally at some point earlier
4 you said that Data Domain went public?

5 A. Yes.

6 Q. Do you remember the year?

7 A. It's 2007.

8 Q. And when Data Domain went public,
9 what was its stock ticker symbol? What was the
10 symbol that goes across to the ticker?

11 A. It was DDUP for dedupe.

12 Q. For deduplication?

13 A. Yeah.

14 MR. KREVITT: Thank you very much,
15 Doctor Li. I have no further questions, Your
16 Honor.

17 THE WITNESS: Thank you.

18 THE COURT: All right. Why don't
19 we take our morning break right now for 15
20 minutes. Can we take the jury out please.

21 MR. KREVITT: Do you want Doctor
22 Li to stay there?

23 THE COURT: Doctor Li, you can
24 step down and take a break. Is there anything

1 you want to discuss?

2 MR. KREVITT: No, sir.

3 MR. VAN NEST: I don't think so,
4 Your Honor.

5 THE COURT: All right. We'll be
6 back in 15 minutes.

7 THE COURT: All right. Are we
8 ready to resume? Dr. Li.

9 MR. KREVITT: We're missing
10 Dr. Li.

11 MR. VAN NEST: Would you like a
12 witness binder now, Your Honor?

13 THE COURT: Sure.

14 All right. Let's get the jury in.

15 MR. KREVITT: Your Honor, I am
16 very sorry, I just flipped open the witness
17 binder, and I know we're going to have a very
18 serious objection to the very first exhibit. We
19 can do that if Mr. Van Nest gets to it or we can
20 do it now. It may just make sense to do it.

21 In the witness binder flipping to
22 it has the very first exhibit is prior art. I
23 don't want to do it in front of the jury.

24 THE COURT: All right. Hold them

1 up.

2 MR. KREVITT: I'm sorry. The very
3 first -- I have only flipped to the first, I
4 don't know if any other prior art is in here,
5 but the very first exhibit is one of Pure
6 Storage's anticipation references, the Venti
7 reference, which presumably they're going to try
8 to question Dr. Li on, which is -- there is lots
9 of case law on this, it's highly improper. He's
10 not an expert.

11 THE COURT: Of course the problem
12 is I don't really know what questions they're
13 going to ask. What are you going to ask,
14 Mr. Van Nest?

15 MR. VAN NEST: It's going to be
16 very brief and it goes to this whole idea of
17 conception. All I want to establish is that
18 Dr. Li attended the conference in January where
19 this paper was presented. He saw the
20 presentation, he read the paper. And just very
21 briefly outline not in any detail, but the
22 subject was a paper on deduplication storage.
23 He's mentioned it --

24 THE COURT: What is the point of

1 this?

2 MR. VAN NEST: The point of this
3 is that this paper was well-known and this
4 presentation was well-known and it was out there
5 and even the inventor saw it a month before he
6 said he conceived his invention. It is one of
7 our prior art references. I'm not going to go
8 into the details, but I want to establish that
9 it was well-known and out there.

10 MR. KREVITT: Your Honor we
11 stipulated to its authenticity and its
12 availability.

13 THE COURT: Well, Mr. Van Nest --

14 MR. VAN NEST: There is no
15 question that it's authentic, but I think that
16 it's significant that one of the inventors was
17 present when it was presented and read it, saw
18 it --

19 THE COURT: So I guess what I'm
20 wondering, it's not going to be challenged on
21 authenticity, I'm sort of okay with asking just
22 as a matter of fact whether he was at this
23 convention, you know, was familiar with the
24 paper. But I'm not really sure why -- what else

1 --

2 MR. VAN NEST: I just want to
3 establish through him just by looking at the
4 title in the abstract that it's about a data
5 storage system, and deduplication in that
6 system. That's basically it.

7 MR. KREVITT: Your Honor, that's
8 exactly what he shouldn't be doing with this
9 witness. This is a Pure anticipation case now.
10 The only thing that's relevant is what is in the
11 four corners of the document. The fact that
12 Mr. Li may have been there and heard is highly
13 irrelevant and prejudicial.

14 THE COURT: Well, I mean, I guess
15 that's what I'm concerned about, because it
16 sounds like you're trying to plant the seed that
17 he copied this.

18 MR. VAN NEST: No.

19 MR. KREVITT: There is no
20 inequitable conduct in this case.

21 MR. VAN NEST: I'm not intending
22 to suggest or plant it, I'm intending to suggest
23 that at the time that he came up with his
24 invention, others were working on the same

1 problem, at or around the same time, and that
2 one of those others was the Venti system that
3 was discussed in a big group of professionals in
4 late January. That's all.

5 THE COURT: All right. Well, I'm
6 going to -- I think there is some relevance to
7 what Mr. Van Nest says, so I'm going to allow
8 him to do it. But there shouldn't be any
9 technical questions. Basically he should
10 identify the article and let your experts talk
11 to the technical stuff.

12 MR. VAN NEST: I will. I'll
13 identify, I would like to display it so we can
14 confirm what it is.

15 THE COURT: I have no problem with
16 showing the cover page.

17 MR. KREVITT: Your Honor, our
18 concern here is knowledge is not an element of
19 anticipation. And none of this was disclosed in
20 an invalidity contention. And it is designed
21 obviously, there is no other reason given that
22 we have stipulated to its availability and
23 authenticity to create in the jury's mind that
24 Dr. Li was aware of certain prior art and

1 Mr. Van Nest said in opening statement, none of
2 the prior art was disclosed to the patent
3 office. We are creating subtext of inequitable
4 conduct claim which is entirely irrelevant. It
5 has zero relevance to anticipation.

6 THE COURT: I don't think I'll
7 hear that. If I here hear that, I'll be very
8 upset. So I'm going to let him do it.

9 MR. VAN NEST: Thank you, Your
10 Honor.

11 THE COURT: All right. Let's get
12 the jury in.

13 (Jury entering the courtroom at
14 11:14 a.m.)

15 THE COURT: All right. Members of
16 the jury, welcome back. Everyone, you may be
17 seated.

18 Mr. Van Nest, you may proceed.
19 Dr. Li, you may be seated.

20 MR. VAN NEST: Thank you, Your
21 Honor. May I approach Dr. Li with a witness
22 binder?

23 THE COURT: Yes.

24 MR. VAN NEST: Thank you.

1 CROSS-EXAMINATION

2 BY MR. VAN NEST:

3 Q. Good morning, Dr. Li.

4 A. Good morning.

5 Q. Dr. Li, you were one of the
6 cofounders of Data Domain; correct?

7 A. Yes.

8 Q. And I believe you said you briefly
9 served as the CEO of the company for a couple of
10 months?

11 A. About two months.

12 Q. And after that, you became the
13 chief technical officer?

14 A. Yes.

15 Q. And you served in that position
16 all the way up until the time that EMC acquired
17 the company?

18 A. No. When I -- in 2004 I returned
19 back to university teaching and doing research,
20 and also around 2006, I was sick, so I took some
21 medical leave. Doctor contribute that to too
22 much work during the startup days.

23 Q. Fair enough. In any event, as a
24 founder, you own stock in Data Domain?

1 A. Yes.

2 Q. And that stock went public at some
3 point?

4 A. Yes.

5 Q. And then EMC acquired the stock
6 when it bought Data Domain?

7 A. Yes.

8 Q. And at that point, you made a
9 great deal of money in connection with that
10 acquisition; correct?

11 A. Yes.

12 Q. And then after Data Domain was
13 acquired, you served on the technical board of
14 EMC?

15 A. Yes.

16 Q. The technical board meets a few
17 times a year to discuss technology?

18 A. Yes.

19 Q. And for that you were also paid at
20 the rate of about \$15,000 a year?

21 A. Yes. In my contract expired April
22 2015.

23 Q. So you served in that position
24 from 2009 to 2015, and were paid that salary

1 each year; correct?

2 A. Yes.

3 Q. And then in addition, as a member
4 of the technical advisory board, you also got
5 stock in EMC; right?

6 A. Very few, but some.

7 Q. But you got shares?

8 A. Yes.

9 Q. And they have gone up in value
10 over time?

11 A. Yes.

12 Q. As a matter of fact, you are being
13 paid as a consultant in this litigation as well;
14 right?

15 A. I was paid to look for materials,
16 not for deposition or as a witness.

17 Q. You were paid at the rate of \$475
18 an hour to search for documents?

19 A. Right.

20 Q. And also to work with the lawyers?

21 A. Yes. But my rate, that's very
22 low, much lower than my typical rate for
23 consulting.

24 Q. But again, that rate was paid in

1 the course of your work in this case, working
2 with the lawyers for EMC, searching for
3 documents, and that sort of thing; correct?

4 A. Right. Looking for documents,
5 yes.

6 Q. Now, when you started Data Domain,
7 you were trying to replace tape system with disk
8 drive; correct?

9 A. Right.

10 Q. And I think you said the focus of
11 Data Domain was on the backup market?

12 A. Yes. That was the focus.

13 Q. Backup storage as opposed to the
14 primary market, is that what you meant?

15 A. Well, actually viewed several
16 kinds of products in the product line, backup
17 was just one of them. We also had product for
18 storing archival data, we called archiver. And
19 also we were sell the line and internally we
20 also have a project Flash memory product using
21 deduplication storage even though that was never
22 shipped.

23 Q. Let's unpack that. I take it the
24 primary market, the market in which Data Domain

1 has had success is the backup market?

2 A. That's the primary market, yes.

3 Q. And you understand -- well, strike
4 that.

5 And the Data Domain products that
6 have had the success, they all use mechanical
7 spinning disks; right?

8 A. Mechanical, magnetic disk drives
9 are the primary media, but we have other storage
10 components in the system.

11 Q. But you understand this case is
12 about the transition from disk to Flash; right?

13 A. What do you mean?

14 Q. This lawsuit is about the
15 transition from disk drive to Flash technology,
16 you understand that, Dr. Li; right?

17 A. I'm not sure what you talking
18 about. I thought this lawsuit was a transition
19 of the product.

20 Q. Now, I take it Data Domain never
21 was able to commercialize a Flash product,
22 right?

23 A. Did not commercialize the Flash
24 product.

1 Q. Right. You had a project to try
2 to build Flash, but eventually you killed that
3 project, correct?

4 A. I don't know what happened,
5 because I was no longer with Data Domain.

6 Q. But in any event you're aware that
7 Data Domain never was able to commercialize a
8 product in the All-Flash market, right?

9 A. I'm not aware.

10 Q. Okay. Now, and there's no mention
11 at all of Flash in either of the '464 or the
12 '015 patents, right?

13 A. Yes, not mentioned.

14 Q. Those patents were developed in
15 the days when mechanical disk was the primary
16 storage means, correct?

17 A. I'm not sure what you mean. There
18 are many forms of media.

19 Q. Let me move on, Doctor Li.

20 A. Yeah.

21 Q. Now, you continued serving on the
22 technical advisory board at EMC right up until
23 April of last year, correct?

24 A. Right.

1 Q. And after 2009, EMC had acquired
2 all of your patents and all of the Data Domain
3 technology, correct?

4 A. Yes.

5 Q. Now, did you become aware through
6 your position on the technical advisory board
7 that EMC went out and bought another company,
8 namely XtremeIO to get into the Flash market?

9 MR. KREVITT: Objection, Your
10 Honor. Foundation and outside the scope of my
11 direct examination. Obviously I didn't touch on
12 any of those.

13 MR. VAN NEST: I asked him whether
14 he knew it, Your Honor. I'm trying to find out.

15 THE COURT: Well, I'm going to
16 overrule the objection. Go ahead.

17 BY MR. VAN NEST:

18 Q. I'll ask it again, Doctor Li.

19 A. Okay.

20 Q. And that is did you become aware?

21 A. Yes, I'm aware.

22 Q. Okay. So even though EMC had
23 possession of all of the Data Domain technology,
24 they went out and bought a different company

1 with different technology to enter the Flash
2 market, correct?

3 A. I don't know how EMC works in
4 terms of acquiring company. I can't --

5 Q. Well, you're certainly aware that
6 in order to enter the Flash market one of the
7 things EMC did was purchase XtremeIO and
8 eventually commercialize their product?

9 A. EMC also bought SSD company, also.

10 Q. So they maybe acquired yet another
11 company. What company is that called, DSSD?

12 A. SSD, that's a Flash memory storage
13 company.

14 Q. All right. So but my point is
15 after they owned all of your technology, they
16 went out and bought other companies to get into
17 Flash, right?

18 A. Yes.

19 Q. Now, did you become aware, as a
20 member of the technical advisory board, that EMC
21 Ventures had approached Pure Storage to discuss
22 its technology?

23 A. I don't -- I don't know about
24 that.

1 Q. Now, you yourself indirectly were
2 an investor in Pure Storage, right?

3 A. Yes. I'm a small limited partner
4 of Greylock, which invested in Pure Storage.

5 Q. So Greylock, that's one of
6 these --

7 A. I'm formal acting CEO and Aneel
8 Bhusri is on the board of Pure Storage.

9 Q. And you are a partner in a venture
10 capitol firm called Greylock; is that right?

11 A. Yes.

12 Q. And Greylock looks at startups for
13 investment?

14 A. Right.

15 Q. And they are trying to pick the
16 best startups and the best investments they can?

17 A. Right.

18 Q. And that's why you've invested in
19 Greylock, right?

20 A. Well, that's not -- I don't make
21 decision for Greylock who to invest. I was only
22 investing Greylock because they asked me to.

23 Q. Okay. But you know that one of
24 the investments Greylock made was in Pure

1 Storage, right?

2 A. Yes.

3 Q. And you've been following and
4 aware of Pure Storage since it was started back
5 in '09 as well?

6 A. I don't know the details about
7 Pure Storage. I know the existence of Pure
8 Storage.

9 Q. Okay. Now, I think you testified
10 on direct that you and your colleagues at Data
11 Domain, you didn't invent the idea of
12 deduplication, that was pretty old?

13 A. Well, what I said was the cause of
14 finding duplicate data start back in the '70's,
15 when we're building compression software. That
16 has been around for decades.

17 Q. And actually in your patent, in
18 the '464 Patent, you mention that there are
19 other forms of deduplication technology that
20 have been attempted, right?

21 A. Right, but they didn't solve the
22 challenging problems. And that's what the
23 invention is about.

24 Q. You mentioned a number of

1 different technologies in the '464 patent that
2 were performing deduplication and indicated
3 yours was better, right?

4 A. It's not only better. I think the
5 previous -- the previous approaches wouldn't be
6 able to build a commercial product. I think
7 that our technique is the one that enabled us to
8 build a commercial product.

9 Q. One of the papers that was out
10 there before your invention was the Venti paper,
11 correct?

12 A. Yes.

13 Q. Now, the Venti paper, let's back
14 up a minute. Do you attend a conference each
15 year called the FAST conference, F-A-S-T?

16 A. Not every year, but I went there
17 several times.

18 Q. Okay. And FAST stands for file
19 and storage technologies, correct?

20 A. Yes.

21 Q. That's an annual conference of
22 file and storage people? You have to give me a
23 verbal answer, Doctor Li.

24 A. Yes.

1 Q. Okay. And you've attended it a
2 number of times in the past?

3 A. Yes.

4 Q. Now, could you open your binder
5 there to DTX-560, please?

6 A. Okay.

7 Q. And can you tell us what you see
8 there? Is that the Venti system paper?

9 A. Yes.

10 Q. Okay. You're familiar with that?

11 A. Yes, we also disclosed this for
12 our patent filing.

13 Q. Okay.

14 MR. VAN NEST: I'd like to move
15 DTX-560 in evidence, Your Honor.

16 MR. KREVITT: No objection, Your
17 Honor.

18 THE COURT: All right. Admitted
19 without objection.

20 BY MR. VAN NEST:

21 Q. Now, Doctor Li, the Venti paper
22 was actually presented at the FAST storage
23 conference inspect late January of 2002,
24 correct?

1 A. Yes.

2 Q. As we have on the screen, this is
3 the title of the -- not the paper, but the
4 proceedings, correct?

5 A. Yes.

6 Q. And you remember that they
7 occurred in late January of 2002?

8 A. Yes.

9 Q. You attended the conference?

10 A. Yes, I did.

11 Q. And you remember attending the
12 presentation of the Venti paper, right?

13 A. Yes. That's why we learned they
14 could not -- their paper is the techniques that
15 couldn't build a commercial product.

16 Q. Doctor Li --

17 MR. KREVITT: Your Honor, if the
18 witness can be allowed to finish his answer,
19 please.

20 THE COURT: I'm going to let him
21 finish his answer. I think he has actually.

22 THE WITNESS: I was about to
23 elaborate a little further, but --

24 THE COURT: Well, so we'll save

1 the elaboration. Go ahead, Mr. Van Nest.

2 MR. VAN NEST: Thank you.

3 BY MR. VAN NEST:

4 Q. My point was you actually attended
5 the presentation in January where this paper was
6 presented?

7 A. Yes, I said I did.

8 Q. Right. And then you actually read
9 the paper?

10 A. Yes, we read the paper to identify
11 the problems that we had not been able to give a
12 product.

13 Q. Can I have the next page and the
14 title of the paper? The paper concerns data
15 storage techniques, correct, the title is a new
16 approach to archival storage, right?

17 A. Right.

18 Q. And that's the problem that you
19 and your inventors were working on at that time?

20 A. Yes.

21 Q. Okay. And the very first sentence
22 indicates --

23 THE COURT: All right. So he's
24 familiar with the paper. That's what you're

1 going to do with him. Is there some other
2 question you have?

3 MR. VAN NEST: The only question I
4 had beyond that, Your Honor, was that the paper
5 in the abstract discusses that it's using
6 deduplication in a data storage system.

7 MR. KREVITT: Your Honor --

8 THE COURT: Is that what the paper
9 is about?

10 THE WITNESS: Well, there was no
11 word called deduplication in this abstract.

12 BY MR. VAN NEST:

13 Q. But, in fact, there is a
14 discussion of a technique for performing
15 deduplication, right, Doctor Li?

16 A. I would say this is a research
17 project at Bell Labs at the time we were using,
18 attempt to view such a system, but they
19 couldn't -- this paper described why it wouldn't
20 work, therefore, we identified all the problems,
21 we learned from this paper that what problems to
22 work on.

23 Q. My question was a little
24 different. Could we highlight that third

1 sentence in addition, duplicate copies of a
2 block can be coalesced reducing the consumption
3 of storage and simplifying the implementation,
4 that means deduplication to professionals like
5 yourself, Dr. Li, does it not?

6 MR. KREVITT: Your Honor,
7 objection. It's exactly what we discussed.

8 THE COURT: All right. I'm going
9 to sustain the objection.

10 Move on, Mr. Van Nest.

11 MR. VAN NEST: I will do so, Your
12 Honor.

13 BY MR. VAN NEST:

14 Q. Now, Dr. Li, you filed for what
15 became the '015 patent in the patent office on
16 December 20th of 2002; correct? If you want to
17 look --

18 A. Maybe.

19 Q. It's DTX 797. And this is also
20 PTX 3, Your Honor, it's already in evidence.
21 I'll put on the screen the cover and let's
22 highlight the December 20 date. So that's the
23 record date in the patent office at which time
24 the patent was filed; right?

1 A. Yes.

2 Q. There are some other dates after
3 that, but that's the official patent office date
4 for the filing of the '015 patent; correct?

5 A. Yes.

6 Q. And you're not exactly sure what
7 specific date you and your fellow inventors
8 actually came up with all the ideas in the '015;
9 correct?

10 A. That's not true. I just testified
11 before about the dates.

12 Q. Is there a specific date that you
13 believe is the date at which --

14 A. February 13, 2002.

15 Q. And that's based on the
16 photographs; correct?

17 A. Based on the name of the file of
18 the photograph.

19 Q. Now, you testified about an
20 architectural specification; correct? Could I
21 have PTX 8, please. And I just want to get
22 clear on this. This architectural specification
23 itself, this document is dated April 3rd, 2002;
24 correct?

1 A. Yes.

2 Q. And so the information in this
3 specification is as of April 3rd of '02; right?

4 A. Yes.

5 Q. And you mentioned a version 0.1
6 that's shown on the face there as having an
7 earlier date; correct?

8 A. Yes.

9 Q. Just to confirm, you were unable
10 to locate that document?

11 A. I could not find that document.
12 It's been so many years ago.

13 Q. You looked in your files, you
14 couldn't find it?

15 A. I looked in my files.

16 Q. You looked in your office, you
17 couldn't find it; right?

18 A. Which office?

19 Q. Well, did you look in an office?
20 Was there more than one location that you
21 searched?

22 A. Well, my office at Princeton
23 doesn't have information of the company. I
24 don't have access to the office.

1 Q. The information for the company,
2 that went to EMC when they bought Data Domain;
3 right?

4 A. That's correct.

5 Q. And as far as you know, EMC hasn't
6 been able to find this March 16 document,
7 either; right?

8 A. I don't know. They didn't tell me
9 whether.

10 Q. But they have all the company
11 records and they got them back in '09 when you
12 sold the company; correct?

13 A. I assume so.

14 Q. Now, you gave a deposition about a
15 month ago?

16 A. Right.

17 Q. Dr. Li, correct, you were under
18 oath for the deposition?

19 A. Yes.

20 Q. And you told us that you weren't
21 exactly sure what was in the earlier version of
22 the April 3rd document; correct?

23 MR. KREVITT: Your Honor,
24 objection. That's not impeachment, quoting a

1 deposition to the witness.

2 THE COURT: Overruled.

3 BY MR. VAN NEST:

4 Q. Dr. Li --

5 A. I don't think I said exactly what
6 you said.

7 Q. Would you open --

8 THE COURT: Wait, Mr. Van Nest.
9 He was speaking.

10 MR. VAN NEST: I'm sorry. Go
11 ahead, Dr. Li.

12 THE WITNESS: I don't think -- I
13 don't remember exactly what I said. That was a
14 seven-hour deposition. I'm not sure what your
15 question was.

16 Q. Well, Dr. Li, you're not exactly
17 sure what was in the earlier version even now
18 because we don't have it; right?

19 A. Right. We don't have the current
20 version. I think what I said was that based on
21 the content of the screen shots, based on our
22 version, I think the version of 0.11 has a minor
23 revision from version 0.1, that's what I said.

24 Q. But you also said you weren't

1 exactly sure what was in the earlier version
2 because you hadn't seen it; right?

3 A. Well, I wrote all version because
4 at that time I was the only person who write
5 specification. I think it would be natural for
6 me to document what we had discussed before,
7 even in version 0.1, that's why I'm assuming the
8 difference is not -- is minor.

9 Q. But you're making that assumption,
10 again, you don't know for sure; right?

11 A. Well, I have the screen shots to
12 remind me of what's in -- what I would write in
13 0.1 version.

14 Q. Could you open your deposition
15 there, Dr. Li, to page 193 at lines 7 through
16 14. Start at line 7, did you give this answer
17 to our question:

18 "Question: But just to be clear
19 for the record, you don't know for certain
20 looking at this document what the differences
21 are in this document with respect to version
22 point one; right?

23 "Answer: I can not tell exactly
24 what was in 0.1. All I can tell, my guess is

1 not a big difference between the two."

2 Did you give that answer?

3 A. Probably. I didn't read this, the
4 record, but probably. That's what I just said a
5 few minutes ago.

6 Q. Now, you never -- as of a month
7 ago, you had not done any element-by-element
8 comparison of this architectural specification
9 with your patents; correct?

10 A. With what?

11 Q. With your patents, with the claims
12 of your patents.

13 A. No.

14 Q. And so --

15 A. I'm aware --

16 MR. KREVITT: The witness --

17 THE COURT: Well, he hadn't done
18 it as of a month ago. Okay. Mr. Van Nest,
19 question.

20 BY MR. VAN NEST:

21 Q. Now, as of then, you hadn't even
22 read the dependent claims in your patent;
23 correct?

24 A. Well, I think our tradition is

1 that when we file a patent, we have a discussion
2 with the patent lawyers. Then we'll come up
3 with a claims before we sign our name as
4 inventor, we need to read all the claims.
5 That's our standard practice.

6 Q. My question was a little
7 different. As of a month ago, you hadn't even
8 read the dependent claims in the '015 patent;
9 right?

10 A. This is what I was trying to
11 answer your question, I'm saying I read that
12 before, before I put my name as a coinventor.

13 Q. But as of a month ago, you hadn't
14 reread the dependent claims --

15 A. No, the dependent claims I read
16 before that.

17 THE COURT: Dr. Li, let him finish
18 the question.

19 Q. You hadn't read the dependent
20 claims; right?

21 A. Do you mean before a month ago or
22 after a month ago?

23 Q. Before a month ago.

24 A. Before the month ago, I'm sure I

1 read it because I would not have signed my name
2 without reading the claims.

3 Q. But you had not read it in years
4 when you gave your testimony a month ago;
5 correct?

6 A. I haven't read -- I haven't read
7 them for a long time. I don't remember how many
8 years. This was filed a long time ago.

9 Q. All right. And obviously you
10 haven't made any comparison of those claims to
11 the very first version of the architectural spec
12 because it doesn't exist; right?

13 A. Can you rephrase your question
14 again? I'm sorry.

15 Q. Yes. You haven't done any
16 comparison between the dependent claims in the
17 '015 patent and the architectural spec, the
18 first version of it, because you can't find the
19 first version; right?

20 A. You are right, I cannot find the
21 first version.

22 Q. Now, let's turn to the three
23 whiteboard photos. You said it was your
24 handwriting on all three of the boards?

1 A. Yes.

2 Q. So you wrote that yourself?

3 A. Yes.

4 Q. And I think you said they were
5 taken with an old camera?

6 A. Yes. With an old camera.

7 Q. You don't have the camera anymore?

8 A. I still have the camera.

9 Q. You still have the camera?

10 A. I still have the camera.

11 Q. Did you testify just a month ago
12 that you didn't have it?

13 A. No, I have the camera. I think
14 the question probably was about whether I have
15 the storage in the camera, the Flash memory of
16 the camera.

17 Q. Open up your deposition, please,
18 Dr. Li, to page 119, lines 17 to 24?

19 A. 119?

20 Q. Yes. Lines 17 to 24.

21 A. Okay.

22 Q. Were you asked this question and
23 did you give this answer:

24 "Question: Now, do you still have

1 the camera that you used to take these photos?

2 "Answer: No, I don't have it.

3 This is a really old camera."

4 Did you give that answer?

5 A. Maybe.

6 Q. Do you have the camera now or not?

7 A. I think I have the camera. It's
8 probably in one of the boxes I haven't opened.
9 But I think I may have the camera.

10 Q. Why did you last see it?

11 A. Several years ago, just very old
12 camera.

13 Q. But a month ago when we asked you
14 that question under oath, you said I don't have
15 it; right?

16 A. Yeah, I couldn't find it at the
17 time. But later I think I seen the camera in
18 the box. I haven't opened -- I just moved to a
19 new house, was doing unpacking.

20 Q. Well, you knew that the issue of
21 when these photos was taken was important,
22 Dr. Li; right?

23 A. Yes, I do.

24 Q. And it's important because the

1 date is very close to the date of one of the
2 other pieces of prior art in this case; right,
3 you know that, too?

4 A. Well, I think to some degree it's
5 not as important because what -- the early
6 employees all remember very well, when Hugo
7 Patterson came to Data Domain --

8 MR. VAN NEST: Your Honor, this is
9 not responsive to my question.

10 THE COURT: All right. Dr. Li, I
11 think you have gone beyond what the question is
12 right now. So I'm going to ask you to stop and
13 Mr. Van Nest ask another question.

14 THE WITNESS: Okay.

15 BY MR. VAN NEST:

16 Q. Now, you don't know whether the
17 date setting in that old camera was correct or
18 not when you took the photos; right?

19 A. I never really checked whether --
20 I believe the dates on the camera were correct,
21 but I don't -- I haven't -- even today if you
22 check, you would not be able to tell whether so
23 many years ago the dates were correct. You
24 can't say anything a hundred percent correct for

1 any computer devices.

2 Q. You told us a month ago that you
3 didn't know whether the date setting on this old
4 camera was right or not?

5 A. I could not say a hundred percent
6 say back in 2002 the dates were correct.

7 Q. All right. Now, let's put up
8 PTX-9. That's the first one. This first photo,
9 Doctor Li, I think we established has a title
10 file date of February 13th, but the metadata
11 shows that it's later, right?

12 A. Right.

13 Q. The metadata shows February 27th
14 and the title of the file says February 13th,
15 right?

16 A. Right.

17 Q. Now, you're the one that created
18 the title on that file, right?

19 A. That's correct.

20 Q. And the title on a file, like any
21 other file, can be changed any time, right?

22 A. It depends on your file system.

23 Q. Your file system would allow you
24 to change that file date any time?

1 A. No. For certain file systems, if
2 you change the name of the file, the date would
3 be changed of the metadata too.

4 Q. Now, I think you testified earlier
5 that you weren't sure exactly when these photos
6 were taken, right?

7 A. I was just trying to refer to you
8 I knew it was in February. I gave you evidence
9 you did not want to take.

10 Q. My question was a little
11 different. Even a month ago you weren't sure
12 exactly when the photos were taken, right?

13 A. I said -- I think I said I was
14 sure it was in February. And I was going to use
15 evidence to show, but you're not allowed me to
16 use that evidence.

17 Q. Well, let me ask you this. Didn't
18 you testify just a month ago, with respect to
19 the meeting where the notes were taken that you
20 don't remember exactly?

21 A. I think I said it was in February.

22 Q. Well, please turn to your
23 deposition again, Doctor Li, at page 271.

24 A. 271.

1 Q. Yep. Lines 10 through 16. And
2 were you asked this question and did you give
3 this answer? All right. Now, when in your
4 recollection did the meeting occur where the
5 notes were recorded on the white board that we
6 see represented in Exhibit C? Answer, I don't
7 remember exactly. Did you give that answer?

8 A. Yes. When I say not exactly, I
9 don't know exactly when was taken in my memory,
10 but I have out of evidence to show it was taken
11 in February, that looks like the Court wouldn't
12 allow me to use that evidence; is that correct?

13 Q. Excuse me, Doctor Li. Haven't you
14 also testified that you thought that the photos
15 were all taken at or about the same time within
16 a day or two of each other?

17 A. I didn't say one or two days. I
18 think we always taken after, but before we need
19 to erase the board. Also when I bring the
20 camera in.

21 Q. My question was, didn't you
22 previously testify that you thought, you guessed
23 that the three photos were taken within a day or
24 two of each other?

1 A. I can't remember things like that
2 so many years ago.

3 Q. But at least as of a month ago you
4 thought, you guessed the photos were taken
5 within a day or two of each other, all three of
6 them?

7 A. I can't remember whether a day or
8 two. But even I said so in the deposition, I
9 could be wrong, because any human memory
10 deteriorates over time. I can't remember 2002
11 exactly what happened.

12 Q. Okay.

13 A. But I have evidence to show it was
14 taken in February sometime.

15 Q. Now, as a matter of fact, the
16 metadata on two of the three photos show they
17 were taken later in March, right?

18 A. Yes.

19 Q. So if it's true that the photos
20 were taken within a day or two of each other,
21 it's possible, isn't it, Doctor Li, that they
22 were all taken in March?

23 A. Well, I don't remember whether how
24 many days were on the board before we took the

1 photo. That's just so many years ago. I can't
2 make such assumption.

3 Q. But it's clear that as to two of
4 the photos, the metadata has a date later in
5 March, right?

6 A. Yes, March 20th.

7 Q. Now, you also, as of a month ago,
8 had not compared the claims of the '015 Patent
9 with anything on the white board, right?

10 A. As I said before, when we file
11 patents, we always review all the claims.

12 Q. Excuse me, Doctor Li, that's not
13 an answer to my question. My question was, as
14 of a month ago when we talked to you under oath,
15 you had not compared any claim of the '015
16 Patent with the elements displayed on the white
17 board, right?

18 A. No, I have not.

19 Q. All right. And that's true for
20 all three of the photos, correct?

21 A. Well, I think how do I describe
22 this? When we file a patent, we --

23 Q. Again, doctor, excuse me. I'm
24 asking you whether the statement you just made

1 is true for all three photos.

2 A. I was just trying to answer how we
3 review -- we review claims when we file for a
4 patent.

5 Q. You'll get a chance to do that
6 with your lawyer. Don't worry, you'll get a
7 chance to do that. My question is simply, as of
8 a month ago you hadn't analyzed whether all of
9 the elements of your claims appeared on the
10 white board, right?

11 A. I did not compare, take out the
12 white boards and compare it with the claims if
13 that's what you meant.

14 Q. That's what I meant. And I think
15 you testified that even with respect to the
16 white boards, you hadn't even read the dependent
17 claims to see what element they had, right?

18 A. As I said before, we always read
19 the claims before we put our name as a
20 co-inventor.

21 Q. Well, what you told us a month
22 ago, Doctor Li, was that with respect to
23 dependent claim 7 of the '015, you hadn't done a
24 comparison to determine whether that was

1 conceived before March 16th, right?

2 A. Well, I did not do a comparison
3 between the claims and the specification, if
4 that's what you meant.

5 Q. And with respect to the dependent
6 claims, you hadn't even read those, right?

7 A. When -- what time frame do you --

8 Q. Prior to your deposition a month
9 ago.

10 A. Well, as I said, we always read
11 the claims before we sign our name. And that's
12 what I did, but close to the deposition, I did
13 not read before I went to the deposition.
14 Again. I did not read again.

15 Q. You told us that Data Domain was a
16 successful company, Doctor Li. I'm switching
17 topics.

18 A. I think -- I would think it's
19 successful, yes.

20 Q. And you're very proud of the work
21 you did there. I take it at Data Domain, you
22 obtained many patents, multiple patents for your
23 work?

24 A. Yes.

1 Q. And all those patents were
2 important in contributing to the success of the
3 products?

4 A. Yes.

5 Q. Okay. And you mentioned
6 compression, that's one of the other
7 technologies that you used at Data Domain?

8 A. Yes.

9 Q. That was important too?

10 A. Yeah. I think in the company we
11 also -- we today call it deduplication. We
12 called it global compression, so compression is
13 meaning both local and --

14 Q. But there were a whole series of
15 technologies that were important to the success
16 of Data Domain, right?

17 A. There are many technologies, yes,
18 but Data Domain is all about building
19 deduplication storage system.

20 Q. But there are many technologies
21 that go into the Data Domain products; right?

22 A. But they are the key technology,
23 the key technology --

24 Q. There are many others that do --

1 MR. KREVITT: Your Honor.

2 THE COURT: Dr. Li, can you maybe
3 say a little louder, finish answering the
4 question that you were just answering.

5 THE WITNESS: Yes. What I was
6 saying is the key technology of Data Domain is
7 deduplication storage system. Technology is the
8 deduplication storage system.

9 BY MR. VAN NEST:

10 Q. There were many other technologies
11 that contributed to the success of your
12 products; right?

13 A. Yes, there are many technologies.

14 Q. And there are many other factors
15 that make success happen, too, like the people?

16 A. Yes, because people invent
17 technologies.

18 Q. And people sell products, too;
19 right?

20 A. People sell the products.

21 Q. People market the products?

22 A. Yes.

23 Q. And the deduplication name I think
24 you mentioned came from a marketing slogan that

1 someone else had come up with; right?

2 A. For market research firm.

3 Q. A market research firm told you
4 that would be good to use and you used it, and
5 that was part of the success, too; right?

6 A. I don't think so. I think the
7 market research firm actually didn't tell us,
8 they don't -- because Data Domain didn't have
9 much money, they didn't really work with
10 research firms.

11 Q. My point was simply that marketing
12 and sales, they're also important to the
13 success; right?

14 A. I'm sure you need many factors to
15 success.

16 MR. VAN NEST: Thank you, Dr. Li.

17 THE COURT: All right. Redirect.

18 MR. KREVITT: Very quickly.

19 REDIRECT EXAMINATION

20 BY MR. KREVITT:

21 Q. Real quick, Dr. Li. Mr. Van Nest
22 asked you questions about whiteboard photos and
23 changing time stamps on cameras. Just to be
24 clear, did anything Mr. Van Nest asked you, have

1 you seen anything that changes or in any way
2 makes you question the testimony that you gave
3 earlier that you are actually certain that by
4 March 16, 2002 you had conceived of all the
5 ideas in the '015 and '464 patents?

6 A. Yes, in February, yes.

7 Q. You had conceived of them in
8 February?

9 A. Yes.

10 Q. And you're absolutely certain of
11 that?

12 A. Yes.

13 Q. And I know we covered your
14 background, you have been a professor at
15 Princeton for thirty years. Is honesty and
16 integrity important to you, sir?

17 A. Yes. As a human being, as a
18 researcher in academics, we have to have
19 integrity.

20 Q. And before today, in your
21 thirty-year career as an acclaimed scientist and
22 professor at Princeton University, has anyone
23 ever challenged your integrity or your honesty?

24 A. Not really. I think -- but I have

1 examples to show that I will maintain my
2 integrity independent of financial gains.

3 Q. You have examples of your
4 integrity, not that anyone has ever challenged
5 you?

6 A. That's right.

7 Q. I just want to be clear. Is there
8 any one you want to share with us, Dr. Li?

9 A. Well, early days at Data Domain,
10 we were looking for someone to join the funding
11 team who has a CEO track record, and one person
12 introduced by the venture capital firm, and this
13 person actually came up with the name Data
14 Domain. And we were experimentally working
15 together for two weeks.

16 And during that time, towards the
17 end, this person came to me, said Kai, you know
18 in this company right now, the most important
19 people are you and me. So this person was
20 trying to discuss with me about how to
21 reposition the founder shares, reducing the
22 founder shares for my two other cofounders and
23 increase mine and obviously this person would
24 get more. And then already agreed with my

1 cofounders not to continue, and we didn't
2 hesitate a second, I disengaged with this
3 person.

4 This person asked me, "Did you
5 fire me?" I said "Yes."

6 I think that I would rather
7 maintain my integrity given in the case I may
8 have financial gain.

9 Q. Thank you, sir. I appreciate your
10 time.

11 MR. KREVITT: No further
12 questions, Your Honor.

13 THE COURT: All right. Dr. Li,
14 you may step down.

15 THE WITNESS: Thank you.

16 MR. KREVITT: Would you like us to
17 call our next witness, Your Honor?

18 THE COURT: I would.

19 MR. KREVITT: Your Honor, EMC at
20 this time has the pleasure of calling Mr. Ian
21 Jestice, a technical expert for the
22 deduplication patents. My colleague, Stuart
23 Rosenberg will be speaking with Mr. Jestice.

24 THE CLERK: Please state and spell

1 your full name for the record.

2 THE WITNESS: My name is Ian
3 Jestice. I-A-N, J-E-S-T-I-C-E.

4
5 IAN JESTICE,
6 the deponent herein, having first
7 been duly sworn on oath, was
8 examined and testified as follows:

9 MR. ROSENBERG: Your Honor, may I
10 approach the witness with a witness binder?

11 THE COURT: Yes, you may.

12 MR. ROSENBERG: May I approach the
13 Court with copies?

14 THE COURT: Yes.

15 DIRECT EXAMINATION.

16 BY MR. ROSENBERG:

17 Q. Good morning, Mr. Jestice.

18 A. Good morning.

19 Q. Can you please explain to the jury
20 very briefly why you're here today?

21 A. Yes. I am Ian Jestice and I have
22 been asked to come here today to talk about two
23 patents, and whether or not Pure Storage
24 infringes those patents.

1 Q. And so let's get something clear
2 right off the bat. There are two deduplication
3 patents at issue in this case; right?

4 A. That's correct.

5 Q. The '015 patent and the '464
6 patent?

7 A. Yes, that's correct.

8 Q. And on one of those two patents,
9 you understand that the parties already agree
10 that Pure Storage infringes the patent?

11 A. Yes, I understand that.

12 Q. Which patent is that?

13 A. That's the '015.

14 Q. So you are not going to in light
15 of that agreement go through infringement of
16 that patent today; is that right?

17 A. That's correct.

18 Q. And then the other patent is the
19 '464 patent?

20 A. Yes.

21 Q. And you are going to express an
22 opinion today about infringement of the '464
23 patent; right?

24 A. Yes, that's one I'm going to talk

1 about today.

2 Q. Is there a dispute about
3 infringement of the '464 patent?

4 A. There is a dispute about one
5 element or one claim on the '464 patent.

6 Q. Do you have an opinion about
7 whether the asserted claim of the '464 patent
8 including that one element is, in fact,
9 infringed by Pure Storage?

10 A. Yes. It's my opinion that that --
11 all of the elements of the claim 32 are
12 infringed by the Pure Storage products.

13 Q. So let's back up a little bit. On
14 the slide here we have just a list of topics I'm
15 hoping to cover with you today. Will you tell
16 us a little bit today about what deduplication
17 technology is?

18 A. Yes. Deduplication technology as
19 you already heard several times is to do with
20 identifying data in a computer system that is
21 going to be stored and to remove duplicates to
22 save space.

23 Q. And just to review the remaining
24 topics, are you going to tell us a little bit

1 about patents at issue, your opinion about
2 infringement of the '464 patent and then some
3 technical issues that relate to damages in the
4 case?

5 A. That's correct.

6 Q. So Mr. Jestice, I'd like to ask
7 you about your background. Can you tell me a
8 little bit about your educational background?

9 A. Yes, I'm -- if you haven't
10 recognized my accent, I'm from the United
11 Kingdom and I attended the City and Guilds
12 Institute of London in 1968 to 1971.

13 Q. What did you study there?

14 A. I studied computer science and
15 telecommunication.

16 Q. And did you get some kind of
17 certification from the City and Guilds
18 Institute?

19 A. Yes, I got a core technological
20 certificate from the City and Guilds Institute.

21 Q. Do you have an understanding of
22 how that compares to a Bachelor of Science
23 degree in the United States?

24 A. When I moved to the United States,

1 almost 40 years ago, the Department of
2 Immigration and the Department of Labor looked
3 at my qualifications and concluded it was
4 approximately the same as a bachelors degree.

5 Q. And while you were in school in
6 London, did you also have any work experience?

7 A. Yes, I was employed by the British
8 government. They owned the telephone company,
9 the Post Office, and I worked for them while I
10 was studying.

11 Q. Did you receive any kind of
12 recognition or reward for your work for the
13 British government while you were there?

14 A. Yes. The Post Office had an idea
15 recognition plan. I developed a system for
16 recognizing the failure of multiple voice and
17 data circuits when they failed digitally.

18 Q. Mr. Jestice, what did you do for a
19 living after you worked for British government?

20 A. I joined IBM.

21 Q. And how long were you at IBM?

22 A. I was at IBM a total of 10 years
23 in England, Canada and the United States.

24 Q. What kind of work did you do at

1 IBM?

2 A. I did many things and I did -- I
3 was a system engineer supporting customers and I
4 was a storage specialist.

5 Q. Did you work on any storage
6 systems as a storage specialist at IBM?

7 A. Yes, I worked on many generations
8 of storage systems that IBM was selling at that
9 time.

10 Q. And I believe we have an example
11 of one of them up on the screen. Can you tell
12 us what this is?

13 A. This is one of my favorite
14 systems. This is the 3340 Winchester disk
15 drive.

16 Q. What is the 3340 Winchester disk
17 drive?

18 A. You can't see the size of this,
19 but it stood approximately up to half way
20 through my chest. It was a big, physically big
21 device. And it held 30 megabytes and 60
22 megabytes in two 30-megabyte drives.

23 Q. How does that relate to the name
24 Winchester?

1 A. Winchester, it got the name of
2 Winchester because this affectionately was known
3 as the 30/30. It held 30 megabytes and 30
4 megabytes. And I believe there's a Winchester
5 rifle that's called the 30/30..

6 Q. And how does this disk drive
7 relate to the disk drives that we've seen
8 earlier in the case and passed around to the
9 jury that you might find in a modern day
10 computer?

11 A. Well, the Winchester disk drive
12 was the first disk drive that incorporated all
13 the mechanical and all the electronics in one
14 package and the rotating drives that the Pure
15 Storage is passing now is a Winchester disc
16 drive. And this it's grandfather or great
17 grandfather.

18 Q. So apart from your work on
19 particular storage systems at IBM, did you do
20 anything else?

21 A. My job supporting customers in the
22 field, so I would support the software,
23 hardware. I did capacity planning for large
24 enterprise customers.

1 Q. What do you mean by capacity
2 planning?

3 A. So the systems I supported were
4 multimillion dollar systems and part of my job
5 at the customer was to help them look at their
6 future needs to predict how much, in this case
7 storage they would need.

8 Q. And apart from your work at IBM,
9 do you have any other work experience that
10 relates to storage systems?

11 A. Yes, after I left IBM, I went to a
12 company all Amdel, company that's now called
13 Fujitsu, partially owned by Fujitsu and as part
14 of my time there, I worked in the storage
15 product department developing storage systems.

16 Q. And do storage systems that you
17 worked on at Amdel include any of the kinds of
18 storage systems the jury is going to hear about
19 and has heard about already in this case?

20 A. Yes, these are large storage
21 systems for event price customers.

22 Q. Did you do any teaching while you
23 were employed at Amdel?

24 A. Yes. Amdel had a very active

1 college recruiting program. That meant that we
2 as engineers, managers, would go out to
3 university, hiring engineers to help us with
4 product development. And the engineers that
5 arrived obviously didn't know Amdel technology
6 and didn't know the actual hands on experience,
7 developing stuff for customers. And so I took
8 classes on our computer architecture error
9 recording and error reporting.

10 Q. Mr. Jestice, in addition to the
11 experience you had working directly on storage
12 systems and teaching relating to storage
13 systems, have you ever founded a company?

14 A. Yes. I founded a company called
15 Zadian Technologies.

16 Q. How do you spell that?

17 A. Z-A-D-I-A-N. And the I-A-N is
18 Ian. That's how we got the name.

19 Q. And what kind of work did you do
20 when you founded Zadian?

21 A. The company we founded produced
22 test equipment for storage systems. And I was
23 the director of design assurance and part of
24 that job was to make certain that the product we

1 were developing was the one that obviously we
2 could sell. We wanted to sell the system. And
3 secondary job I did there was as the IT manager.
4 I managed the IT, all the computers for the
5 corporation.

6 Q. How long did you work at Zadian?

7 A. I worked there until we sold the
8 company to a company called Xyratex.

9 Q. What is Xyratex?

10 A. Xyratex is a contract manufacturer
11 that makes computer systems, storage systems for
12 other companies.

13 Q. Mr. Jestice, how many years of
14 experience in total do you have working on
15 technologies that relate to storage systems?

16 A. I've been working on storage
17 systems since I worked for the Post Office,
18 almost 40 years.

19 MR. ROSENBERG: So Your Honor,
20 we'd ask the Court to accept Mr. Jestice as an
21 expert in the field of storage systems.

22 MR. VAN NEST: No objection, Your
23 Honor.

24 THE COURT: All right. You may

1 proceed.

2 BY MR. ROSENBERG:

3 Q. Mr. Jestice, now that we've talked
4 about your background, I'm hoping you can help
5 gives us some background on the technology at
6 issue in this case. What is the technology that
7 you're here to talk about that's at issue in
8 this case?

9 A. The technology is about storage
10 systems, large enterprise storage systems. And
11 in particular one called deduplication.

12 Q. What is a storage system?

13 A. Companies that want to store --
14 okay. A storage system stores computer data.
15 And this storage system that we're talking
16 about, this arena is to do with very large
17 amounts of data stored by large companies.

18 Q. And I have a slide here. Can I
19 ask you to explain, starting with what's at left
20 side. I think it's a little cut off on the
21 screen there with the word hosts, what's going
22 on in this illustration of data storage
23 technology?

24 A. Yes, in the left side are the host

1 computers which would typically be workstation
2 is or PC's and then between them is a data
3 stream and the data stream goes over on
4 interface which could be fiber optic, it could
5 be copper on the storage system itself. And on
6 the right side is a storage system consisting of
7 a controller and some storage element.

8 Q. So let's just take those one at a
9 time. The host are things like people
10 individual computers; is that right?

11 A. These are people looking at their
12 email, writing email, looking at databases, just
13 the sort of things that computers are so much
14 involved with in our society today.

15 Q. And the data stream is the data
16 that's moving from the host into a storage
17 system?

18 A. Yeah. This is data typically
19 split up into blocks or segments.

20 Q. And how much data are we talking
21 about streaming or flowing into a storage
22 system?

23 A. It depends on that interphase, but
24 it's huge amounts of data. We're talking about

1 sending a movie in a second or less over these
2 streams.

3 Q. And then inside the data storage
4 system on the right side of the graphic here,
5 there are two parts, the controller and the
6 storage elements. What is a controller in a
7 data storage system?

8 A. The controller in many systems
9 certainly today is a little computer itself,
10 running software. And it is like a librarian in
11 a book library. When it receives the streams of
12 data, it decides what to do with it, where to
13 put it and how to handle it.

14 Q. What are the storage elements
15 inside a data storage system?

16 A. Storage are the devices that
17 actually store the data.

18 Q. What are those storage elements
19 made up of, what's the media in there?

20 A. Historically they have been --
21 they could have been tape drives, rotating disk
22 drives that you have seen or the solid state
23 Flash memories.

24 Q. So we have shown some examples of

1 each of those three here. If a company is
2 making a storage system, how do they choose
3 which one of these three to use as the storage
4 elements?

5 A. Well, like most things in
6 computers there is a trade off between the price
7 and the performance. So the tape drives are
8 typically very cheap and relatively slow. The
9 hard disk drive is much faster but much more
10 expensive than tape. And then the Flash drive
11 is even faster, but it's more expensive than
12 hard disk drives.

13 Q. Is there technology that can make
14 the more expensive kinds of media, the hard disk
15 drives or the Flash memory, more affordable for
16 use as a storage element in a storage system?

17 A. One way is to actually save less
18 data.

19 Q. And is deduplication a way to do
20 that?

21 A. Deduplication is one of those
22 technologies.

23 Q. Tell us briefly what is
24 deduplication?

1 A. Deduplication is identifying
2 duplicate data and removing, just keeping a
3 single copy.

4 Q. Can you give us an example of that
5 in the real world?

6 A. So if you were working at a
7 company that let's say a thousand people and the
8 president sent out a thousand emails, the same
9 thousand emails to every employee, without
10 deduplication, every one of those employees
11 would save a copy of their emails. So with
12 deduplication the system would identify those
13 and only save one copy of the email, saving a
14 significant amount of space on the storage
15 systems.

16 Q. Mr. Jestice, does all
17 deduplication work in the same way?

18 A. No. There is two kinds that I am
19 going to talk about today, background
20 deduplication and inline deduplication.

21 Q. Turning the first one you
22 mentioned which is background deduplication, can
23 you explain to us how background deduplication
24 works?

1 A. Yes, I can. So I have a --
2 something to show how this works. On the
3 left-hand side is the hosts as I described
4 before and there is a data stream coming across
5 the interphase to the storage system itself. In
6 background deduplication, a segment will come
7 into the storage controller, we have the
8 animation.

9 Q. Which segment in particular are we
10 highlighting here?

11 A. The first segment which is marked
12 P2, P2 is a representation of the data.

13 Q. Some of the segments have already
14 been stored; right?

15 A. Some of the segments will already
16 be stored.

17 Q. For example, maybe A9?

18 A. Yes.

19 Q. And how does background
20 deduplication work on segments that have already
21 been stored?

22 A. So in background deduplication,
23 there is a processor running in the storage
24 controller that is going around looking for

1 duplicate sectors. So as A9 in this case was
2 stored in two different places, I would say
3 erroneously, but as part of background
4 deduplication it would pick up that duplication
5 and delete one of the copies.

6 Q. And there is animation of deleting
7 the copy there. What does the word background
8 have to do with this?

9 A. Background typically describes a
10 process in a computer that's running in its
11 spare time, if you like, it's when the computer
12 is not handling its major task, so this would
13 just use up resources going around trying to
14 find these duplicates.

15 Q. And so this is a process operating
16 on data that's already been stored in a storage
17 system?

18 A. Yes. In this case, both copies of
19 the data were stored in the storage system
20 first.

21 Q. You mentioned a different kind of
22 deduplication, I believe you called it inline
23 deduplication. Can you explain how that works
24 and how it's different from background

1 deduplication?

2 A. Yes. Inline deduplication looks
3 for the data before it's stored and, therefore,
4 saving the extra store.

5 Q. So what happens, for example, if
6 data comes in that has not yet been stored?

7 A. So data comes into the storage
8 controller, in this case we have a block that's
9 got C4, and the storage controller looks to see
10 if there is a duplicate already. And in this
11 example there wasn't. So it stores C4 the first
12 time.

13 Q. So in inline deduplication, you're
14 looking for a duplicate of a segment that you
15 have not yet stored; is that correct?

16 A. That's correct.

17 Q. And if you don't find a duplicate,
18 then you'll store the segment?

19 A. Then you store the segment.

20 Q. And in this example we showed the
21 data inside that segment, the C4?

22 A. Yes.

23 Q. And what happens if a data segment
24 comes in that is a duplicate?

1 A. If there is a duplicate, in this
2 case we're using P2 as an example, the storage
3 controller during the storage process finds P2
4 and, therefore, doesn't need to write it a
5 second time.

6 Q. And so what happens to the copy of
7 P2 that's just arrived but hasn't yet been
8 stored?

9 A. That is just discarded.

10 Q. Mr. Jestice, as between the two
11 kinds of deduplication you just showed us,
12 background, operating on data that's already
13 been stored, and inline where you're operating
14 on data you haven't yet stored, does inline
15 deduplication have any advantages over
16 background deduplication?

17 A. In this technology, it has. We're
18 talking about Flash memories, solid state
19 memory, it has two distinct advantages.

20 Q. What are they?

21 A. The first is you don't have to
22 write the data twice, so that saves you having
23 to buy extra storage to hold that data until the
24 background process came in and cleared it out.

1 So that's one significant advantage.

2 The other advantage is the Flash
3 technology itself is not like rotating disks and
4 magnetic disks, it wears out, and it's a bit
5 like a paperclip. If you take a paperclip and
6 bend it twenty times or so, it will snap. Flash
7 storage fails after a number of writes. So if
8 we don't write the data, then we don't wear out
9 the drives so quickly, which saves money again.

10 Q. And Mr. Jestice, are there any
11 difficulties associated with performing inline
12 deduplication as opposed to background deduplication?

13 A. Yes, there is a problem called
14 latency or delay. That background, that inline
15 deduplication takes a finite amount of time.
16 And so we have to be able to handle that fast
17 enough to not delay the saving of data from the
18 other users or even the user that's trying to
19 save the data.

20 Q. And am I correct just to summarize
21 that then inline deduplication has advantages
22 over background deduplication with respect to
23 how much memory you have to have and whether you
24 wear it out, but there are difficulties in

1 implementing inline deduplication?

2 A. Yes. There have been difficulties
3 trying to reduce that latency.

4 Q. And Mr. Jestice, how does the
5 technology that you just described relate to the
6 patents that are at issue in this case?

7 A. Well, the patents that are at
8 issue in this case, in this case, are describing
9 a better way, a more efficient way to do inline
10 deduplication.

11 Q. Mr. Jestice, is this one of the
12 two patents you reviewed in this case?

13 A. Yes, this is the '015 patent.

14 Q. What's the title of this patent?

15 A. Efficient data storage system.

16 Q. Is this the other patent you
17 reviewed in the case?

18 A. Yes, this is the '464 patent.

19 Q. And what's the title of this
20 patent?

21 A. It's the same title, it's
22 efficient data storage system.

23 Q. Were you here earlier today when
24 Kai Li testified about his work at Data Domain?

1 A. Yes, I was.

2 Q. Do you see Data Domain listed on
3 the patent?

4 A. Yes, Data Domain is listed on the
5 lower left-hand corner as the assignee.

6 Q. And do you understand how Data
7 Domain relates to the parties in this case?

8 A. My understanding is that Data
9 Domain was taken into the EMC fold.

10 Q. And is a part of EMC?

11 A. It is part of EMC now, yes.

12 Q. Mr. Jestice, had you heard of Data
13 Domain before you got involved in this patent
14 case?

15 A. Yes, I had. Anyone that was
16 working in that enterprise storage business
17 would have heard of Data Domain.

18 Q. Turning back to the patents, can
19 you tell us very briefly at a high level, what
20 is the invention in the deduplication patents?

21 A. Well, it says it in the title,
22 it's an efficient data storage system. It is
23 deduplication and in particular this is inline
24 deduplication.

1 Q. Mr. Jestice, is there a part of
2 the specification in the patent that discusses
3 the problems associated with duplicate data?

4 A. Yes. The specification or
5 description of a patent, they describe what the
6 problems were. For example, several copies of
7 the same data, we have highlighted here.

8 Q. And before Dr. Li and his
9 colleagues tried to solve this problem, had
10 anyone else tried to solve the problem of
11 duplicate data in the storage system?

12 A. Yes, there were other people
13 working on the problem.

14 Q. Does the specification acknowledge
15 that?

16 A. The specification talks about the
17 problems that were.

18 Q. What does the specification say
19 very briefly?

20 A. It says there have been many
21 attempts to prevent redundant coping of data.

22 Q. What does the specification say
23 about whether those attempts from been
24 successful?

1 A. It says these approaches incur
2 significantly latency. It would have been
3 desirable to reduce the latency, so it's
4 addressing the problem of latency, the time it
5 takes to write the data.

6 Q. Can you explain one more time what
7 is latency, and maybe give us an example of how
8 that would affect somebody in the real world?

9 A. It's the delay writing data. If
10 you were working in an organization with such a
11 system and you were saving a document, saving an
12 email, if there was significant latency, you
13 would see a little clock going around and around
14 and around while you were waiting. This idea
15 reduces that latency, which means you would get
16 a faster turnaround when you save data.

17 Q. Mr. Jestice, how did Dr. Li and
18 his colleagues solve that problem in the
19 deduplication patents?

20 A. They came up with an idea for
21 doing preliminary checks that efficiently would
22 determine whether the data had been deduplicated
23 already.

24 Q. What do you mean by preliminary

1 checks, why preliminary?

2 A. A preliminary check is done early,
3 it's done inline, and it's not a hundred percent
4 certain whether it is a duplicate or not, but it
5 can be done quickly.

6 Q. And why would a preliminary check
7 be better than just doing a certain check
8 against all of the data you already have stored?

9 A. A preliminary check can be done
10 very quickly and the full check takes a lot
11 longer.

12 Q. Mr. Jestice, now that we have
13 looked at the specification in the patents, I
14 would like to turn to the '464 patent claim
15 that's at issue in this case. Is it your
16 understanding that there is a dispute about
17 whether Pure Storage infringes this claim?

18 A. The dispute is only about the last
19 elements of this claim.

20 Q. And is it your understanding that
21 the parties agree that the Pure Storage products
22 meet the earlier elements of the claim?

23 A. Yes. My understanding is the
24 parties agree that Pure Storage infringes the

1 first two elements of this claim.

2 Q. Okay. I would like to get to the
3 disputed element in a minute, but just start
4 with a little bit of background about what this
5 claim says. It starts with the language, a
6 computer program product for storing the data
7 embodied in a computer readable medium and
8 comprising computer instructions. Can you
9 explain what that means in plainer English?

10 A. This means a computer program,
11 software that's designed for very specific
12 purpose, storing data. The computer program is
13 on a -- some device that's readable by a
14 computer such as a disk, CD, Flash drive. And
15 it consist of instructions, computer
16 instruction, software.

17 Q. And do the Pure Storage products
18 that are accused of infringement in this case
19 include a computer program product that includes
20 instructions for the steps listed here?

21 A. Yes, they do. They call it Purity
22 software.

23 Q. What is Purity software?

24 A. It is the software that's a bit

1 like the Windows software, for example, if
2 you're running on a PC, except this software is
3 designed for a storage system.

4 Q. So it's the operating system for
5 the Pure Storage products?

6 A. Yes, it is.

7 Q. And how do you know that the Pure
8 Storage products have this Purity software on it
9 that performs these steps?

10 A. I have looked at the software, the
11 source code of the software.

12 Q. What is source code?

13 A. Source code of the instructions
14 that an engineer would write to create the
15 software.

16 Q. And apart from the source code,
17 did you look at any other materials that
18 informed you about what the Purity software on
19 Pure Storage products is and how it works?

20 A. Yes, I have listened to
21 depositions. I have looked at manuals --
22 depositions of Pure Storage employees. I have
23 looked at manuals produced by Pure Storage.

24 Q. And Mr. Jestice, can I ask you to

1 turn in your binder to Exhibit 12, which is the
2 FlashArray users guide. And my question for
3 you, is that one of the documents you reviewed
4 in reaching your opinions about infringement?

5 A. This is one of the user guides,
6 yes, it is.

7 MR. ROSENBERG: Your Honor, we
8 move Exhibit 12 into evidence.

9 MR. VAN NEST: No objection, Your
10 Honor.

11 THE COURT: Admitted without
12 objection.

13 BY MR. ROSENBERG:

14 Q. And Mr. Jestice, does the
15 FlashArray users guide discuss the Purity
16 software that you were referring to earlier?

17 A. Yes, it does. It tells the
18 customer how to use the whole system including
19 the Purity software.

20 Q. I would like to turn back to the
21 patent claim language and ask you about the
22 steps that the software must perform according
23 to this claim. We're going to put a checkmark
24 next to the beginning there to indicate that the

1 Pure Storage include this computer program
2 product. So I would like to start here. Can
3 you read for us what that claim language is?

4 A. This says receiving a data stream
5 comprising a plurality of data segments wherein
6 each data segment is associated with an
7 identifier.

8 Q. In your understanding, has the
9 Court provided a definition or a claim
10 construction for any of the language in this
11 part of the patent claim?

12 A. Yes, the Court has.

13 Q. Let's take a look.

14 THE COURT: Before we do that,
15 Mr. Rosenberg, so members of the jury, one of
16 the responsibilities I have as a judge is
17 sometimes in a patent claim I have to give
18 what's called a construction to a term that
19 appears in it. And I do that before we have the
20 trial and then what happens is that construction
21 that I give it is what the parties have to use
22 as the meaning of that term.

23 So when I construed a term, it's a
24 legal analysis, that's the reason why the judge

1 does it rather than the jury. But then you have
2 to take when you're evaluating infringement or
3 invalidity down the road, you have to accept the
4 construction that I have given. And I believe
5 that the constructions are -- they're written
6 down in an order, but the Purity does not have
7 that; right?

8 MR. KREVITT: I believe they
9 certainly will. I'm not certain it was included
10 in the materials yet, Your Honor.

11 THE COURT: In any event, there
12 will be -- before the case is over there will be
13 at least an order of about three pages that you
14 will have that has exactly every construction
15 that I have given in this case. There is maybe
16 about I would say ten terms or so that I have
17 construed. And when the lawyers say -- I'm not
18 going to say this every time when this comes up.
19 When the lawyers say there is a construction
20 that the Court has given, that's what they're
21 talking about.

22 Go ahead, Mr. Rosenberg.

23 MR. ROSENBERG: Thank you, Your
24 Honor.

1 BY MR. ROSENBERG:

2 Q. Mr. Jestice, has the Court
3 provided a construction or a meaning for any of
4 the language here in this sentence?

5 A. Yes, it has.

6 Q. Can we take a look and can you
7 tell me what that is?

8 A. The Court has defined identifier
9 meaning information that identifies a data
10 segment.

11 Q. Did you apply this construction in
12 reaching your opinion about whether the Purity
13 software in Pure Storage's products meets this
14 limitation of the patent claim?

15 A. Yes, I did.

16 Q. And in general, so I don't want to
17 ask this every time, did you apply the Court's
18 constructions of the language in the claim when
19 reaching your opinion about infringement?

20 A. All the way through, yes.

21 Q. Mr. Jestice, is it your opinion
22 that Pure Storage's products and the software on
23 them meet this limitation of claim 32 of the
24 '464 patent?

1 A. Yes, it is.

2 Q. Do you understand Pure Storage to
3 disagree with you about that?

4 A. Pure Storage agrees with me on
5 that.

6 Q. I think we'll put a checkmark
7 there to indicate that that's agreed. And we'll
8 move on to the determining step. Can you read
9 this claim step for the jury?

10 A. It's determining using a subset of
11 identifiers that are stored in low latency
12 memory when a data segments has been previously
13 stored.

14 Q. Has the Court provided a
15 construction for any of the language in this
16 term?

17 A. Yes, they have.

18 Q. Okay. So I'd ask you to explain
19 what those are?

20 A. So, first defining, the Court has
21 defined -- determining. The Court has defined
22 that to mean deciding either conclusively or
23 inconclusively.

24 Q. And is there any other language in

1 the claim that's been construed?

2 A. Yes, there is.

3 Q. Can you explain?

4 A. Low latency memory has been
5 described as a memory or cache that can
6 generally be read more quickly or has better
7 throughput than the large memory that stores the
8 entire segment data base.

9 Q. And so we see that word latency
10 again. Can you remind us what latency is and
11 how it would relate to memory?

12 A. This is the delay, the time it
13 takes to do something.

14 Q. And so the Court has explained
15 that the low latency memory is memory that can
16 be read more quickly than other memory; is that
17 right?

18 A. That's what they define it as,
19 yes.

20 Q. And I believe there's one more
21 correction here by the Court to this claim; is
22 that right?

23 A. Yes, the claim says data segments
24 and the court has corrected that to data

1 segment.

2 Q. Mr. Jestice, is it your opinion
3 that Storage's products and specifically the
4 software on those products meets this limitation
5 of Claim 32?

6 A. Yes, it does.

7 Q. And does Pure Storage disagree
8 with you about that?

9 A. Pure Storage agrees with me on
10 this.

11 Q. So I'm adding a check mark there
12 to indicate that. And now we've come to the
13 last limitation of Claim 32. Can you read for
14 the jury what this limitation is?

15 A. Yes, this is returning the
16 identifier for the data segment in the event
17 that the data segment is determined to have been
18 stored previously.

19 Q. And has the Court provided a
20 construction for language in this limitation?

21 A. Yes, they have.

22 Q. Can you explain?

23 A. They have defined returning to
24 mean delivering back.

1 Q. And Mr. Jestice, is this the
2 element of the claim where Pure Storage
3 disagrees with you about whether there's
4 infringement?

5 A. Yes, it is.

6 Q. Okay. In your opinion, does the
7 Purity software on every one of the FlashArray
8 products that Pure Storage sells meet this
9 limitation of Claim 32?

10 A. Yes, it's my opinion that Pure
11 Storage products do infringe this element of the
12 Claim 32.

13 Q. And how many ways does Pure
14 Storage perform this element?

15 A. They actually perform it two ways.

16 Q. And so I'd like to ask you to
17 explain your opinion about that and we have an
18 animation to help, so we're going to turn to
19 that. Backing up, can we talk a little bit
20 about how Pure Storage's deduplication process
21 works? Do you understand whether Pure Storage
22 uses a form of inline deduplication?

23 A. Yes, they do.

24 Q. Okay. And what happens in Pure

1 Storage's inline deduplication process?

2 A. So this is a very similar diagram
3 to the one I used before and there's an data
4 stream coming in from the left and the storage
5 element on the right and the storage control in
6 the center.

7 Q. Okay. And what is P2 in this
8 diagram?

9 A. P2 is a segment that came in, a
10 block of data, and just for this discussion
11 we're saying it contains the data P2.

12 Q. So P2 would be the actual
13 information in the incoming data?

14 A. Yes, it would be.

15 Q. Like the content of part of a
16 document?

17 A. Yes, it would be.

18 Q. And what is the next thing that
19 happens in Pure Storage's inline deduplication
20 process?

21 A. The next that happens is the
22 storage controller assigns an identifier. I'm
23 using this rotating cog to show that this is a
24 software program that's running.

1 Q. So is this the Purity software
2 that's being represented by the rotating gear?

3 A. This is the Purity software that's
4 assigned that identifier and it, just for, as an
5 example, it's like a name tag that you'd stick
6 on.

7 Q. Okay, so the content of the data
8 that we're talking about here is P2?

9 A. Yes, the content is P2 and the
10 identifier is the name tag Ed.

11 Q. And why does the software assign
12 an identifier to the incoming data segment?

13 A. So it can go do a preliminary
14 check to see whether there's a duplicate.

15 Q. And is there any disagreement, to
16 your understanding, between the parties about
17 whether the Purity software assigns this
18 identifier to an incoming data segment?

19 A. No, I believe that Pure Storage
20 agrees with that it assigns an identifier.
21 There's no disagreement on that.

22 Q. So after the Purity software has
23 assigned an identifier to than incoming data
24 segment, here P2, what's the next that happens

1 in Pure Storage's inline deduplication process?

2 A. The Purity software goes to a
3 structure called the SD table.

4 Q. What is the SD table?

5 A. It's the successfully deduplicated
6 table. It's a list of segments that were
7 previously deduplicated.

8 Q. And does the SD table contain the
9 identifiers or in this case mention the nametags
10 of segments that have already been determined to
11 be duplicates?

12 A. Yes, the identifiers, the name
13 tags are what's in the SD table and some way of
14 joining it up with the data, but yes, it
15 contains the identifiers.

16 Q. And what is the usefulness of a
17 table that contains information about segments
18 you've already determined to be duplicates if
19 what you're trying to do now is determine that
20 an incoming segment is or isn't a duplicate?

21 A. Well, if you think back to those a
22 thousand e-mails I was talking about, if you
23 receive -- if the storage system receives one
24 duplicate, it's likely there will be more, so if

1 you keep track of the recently successfully
2 deduplicated ones, you may save some time.

3 Q. So how does the Purity software
4 use this SD table in the inline deduplication
5 process?

6 A. The Purity software takes the
7 identifier and compares it with the contents of
8 the SD table.

9 Q. And what happens if the Purity
10 software determines that there is no match in
11 the SD table for the identifier of the incoming
12 data segment?

13 A. Yeah, so the animation showed the
14 Purity software searching in the SD table, not
15 finding it, and then it will make a decision to
16 go to another table, called the recent table.

17 Q. What is the recent table?

18 A. The recent table is another list
19 of segment identifiers that the Purity software
20 has seen before.

21 Q. And how does the Purity software
22 use the recent table?

23 A. The Purity software searches
24 through the recent table looking to see if there

1 was a match of the identifier.

2 Q. And what happens if the Purity
3 software, after comparing the identifier in the
4 incoming segment to the identifiers in the
5 recent table finds a match, what happens if the
6 identifier of the incoming segment is matched to
7 an identifier in the recent table?

8 A. So the Purity software now goes
9 and checks that the incoming segment data
10 matches the saved data to be absolutely certain
11 it's the same.

12 Q. So on the left-hand side of the
13 screen you were comparing the name tags and now
14 over here on the right-hand side we're comparing
15 the actual data?

16 A. Yes.

17 Q. And have you reviewed the source
18 code that Pure Storage uses to perform this
19 comparison to determine whether an incoming
20 segment is potentially a duplicate of an already
21 stored segment?

22 A. Yes, I have. The software is long
23 and complex, but typically software designers
24 split the logic of the programming into little

1 pieces, functions or subroutines and there's a
2 subroutine called compare dup which is software
3 that actually compares data.

4 Q. That's the software that would
5 perform the comparison in the top right?

6 A. Correct.

7 Q. Okay. Is there also software that
8 performs the lookups that takes the identifier
9 of the incoming segment to the SD table and the
10 recent table and performs those lookups?

11 A. Yes, that's another function
12 called hash lookup.

13 Q. You said hash lookup?

14 A. Correct.

15 Q. What does the name hash have to do
16 with anything here?

17 A. The hash in computer science terms
18 is an identifier that can be created in many
19 different ways, but it's generally called a
20 hash.

21 Q. And so here the name hash refers
22 to the identifier or the name tag in our
23 example?

24 A. Yes.

1 Q. And the name of the function is
2 hash lookup?

3 A. Correct.

4 Q. Okay. And what happens -- let me
5 back up and first ask this. Is there any
6 dispute as far as you understand between
7 yourself and Pure Storage and Pure Storage's
8 expert about whether the software is performing
9 these lookups in the order that you have
10 described here?

11 A. No. I think both experts agree
12 this is actually how it works.

13 Q. Okay. What happens next in the
14 Pure Storage inline deduplication process if the
15 software determines that the incoming data
16 segment is a duplicate of a segment that's
17 already been stored, if P2 matches P2?

18 A. Then the Purity software takes the
19 identifier and stores it in the SD table,
20 successfully deduplicated table, because the
21 Purity software has just decided that it -- it
22 has successfully deduplicated this segment.

23 Q. And is there a disagreement
24 between yourself and Pure Storage's expert

1 witness about whether the Pure Storage software
2 is putting the identifier in the SD table at
3 this point in the process?

4 A. My understanding is that he
5 agrees.

6 Q. Now, I'd like to turn back, if I
7 can, to the claim language here. I'm sorry,
8 there's one more step, isn't there? Can you
9 explain what that was?

10 A. Yes, once we've decided it's
11 duplicate, we can discard the P2 that came in
12 from the data stream.

13 Q. Okay. And now I'd like to turn
14 back to the claim language that's at issue here.
15 Which part of what you just showed us in the
16 inline deduplication process in Pure Storage's
17 products is the part that you think is
18 delivering back the identifier for the data
19 segment in the event that the data segment is
20 determined to have been stored previously?

21 A. This is when the Purity software
22 delivers the identifier back into the SD table.

23 Q. So that's step three in the little
24 yellow arrows there?

1 A. Step three, it's going back to the
2 SD table to put the identifier in.

3 Q. And do you understand whether Pure
4 Storage's expert agrees with you that this step
5 meets this limitation of the claim?

6 A. No, he disagrees with me.

7 Q. And why do you think he disagrees
8 with you?

9 A. He says that in order for it to
10 deliver back, then the identifier has to have
11 been there before.

12 Q. The identifier has to have been
13 stored in the SD table in Pure Storage's
14 expert's view?

15 A. In his view, yes, it has to have
16 been stored in the SD table before it can be
17 returned back there.

18 Q. And do you think he's right about
19 that?

20 A. Well, it doesn't make any sense.
21 And so no, I don't think it needed to be stored
22 there before.

23 Q. And so turning back to the claim
24 language for a moment, can you explain one more

1 time how you think this claim language
2 delivering back the identifier in the event that
3 the segment's determined to have been stored
4 previously is met by Pure Storage's system?

5 A. Well, this is just one of the ways
6 that that claim element is met, but it is in the
7 storing -- it's in the storing of the identifier
8 in the SD table by the Purity software that's
9 already been to the SD table.

10 Q. Okay. And you mentioned this is
11 one of the ways. I'd like to ask you in a
12 couple minutes about the other ways. But first,
13 were you here for Pure Storage's opening
14 presentation?

15 A. Yes, I was.

16 Q. And did you see Pure Storage's
17 counsel present an animation of the process of
18 checking the SD table and the recent table?

19 A. Yes, I did.

20 Q. Okay. And is this the animation
21 that you saw presented?

22 A. Yes.

23 Q. Mr. Jestice, do you think that
24 this animation accurately characterizes what is

1 happening in the Purity software that's at issue
2 in this case?

3 A. I don't think it accurately
4 describes it. And it's also only one of the
5 ways that the software infringes.

6 Q. And so did you have an opportunity
7 after viewing this yesterday to direct the
8 preparation of a demonstrative with edits to
9 this one to show how you think the software
10 really works?

11 A. Yes, I did.

12 Q. Okay. And is this the
13 demonstrative you directed the preparation of?

14 A. Yes.

15 Q. And what's going on here?

16 A. So the data is coming into the
17 controller, the identifier is first being
18 checked against the contents of the SD table,
19 then it's being checked against the contents of
20 the recent table. And in the event it wasn't
21 found in the SD table the first time, in the
22 event it was found in the recent table, it is
23 delivered back to the SD table.

24 Q. And can you remind us what that

1 spinning gear was in the animation?

2 A. This is the Purity software.

3 Q. So the Purity software is taking
4 the identifier to compare it against the SD
5 table and then compare it against the recent
6 table and if the segment is determined to be a
7 duplicate, it is in your view delivering it back
8 to the SD table?

9 MR. VAN NEST: Objection.

10 Leading, Your Honor.

11 THE COURT: All right. I'll
12 sustain it.

13 BY MR. ROSENBERG:

14 Q. Mr. Jestice, in which point in
15 your diagram do you view constitutes delivering
16 back to the SD table?

17 A. It's exactly the same as in my
18 diagram, the modified Pure Storage diagram, in
19 step three when we take the identifier and put
20 it back in the SD table, deliver it back to the
21 SD table is the step.

22 Q. Okay. Mr. Jestice, a few minutes
23 ago you mentioned you think there's another way
24 that the Purity software meets this claim

1 element of delivering back the identifier; is
2 that right?

3 A. Yes, that's correct.

4 Q. And what is that other way?

5 A. So the Pure Storage expert says
6 that the, there's a requirement to have a return
7 statement, which is a very specific computer
8 instruction.

9 Q. What is a return statement?

10 A. It's an instruction. I talked a
11 little bit about the subroutines, where you try
12 to split your program up into distinct parts.
13 At the end of one of these subroutines or
14 functions, there's frequently a return
15 statement, which is the exit from that function.

16 Q. And with reference to what's on
17 the screen, is this what a return statement
18 might look like?

19 A. It may. A return statement can
20 return nothing or it could return some value.

21 Q. Is there a return statement in the
22 Purity software that you've looked at in
23 connection with this delivering back or
24 returning the identifiers?

1 A. Yes, there is.

2 Q. And in your opinion, does that
3 return statement meet this claim step of
4 returning the identifier?

5 A. Yes, that also meets this claim
6 step.

7 Q. How does it do that?

8 A. Because the claim requires
9 delivering back the identifier and that the
10 return statement returns the identifier back in
11 the form of an index.

12 Q. What is an index?

13 A. An index is an address within an
14 array. It's sort of like a pointer to the
15 actual data.

16 Q. And how does returning the index
17 in your view meet the step of returning the
18 identifier?

19 A. Well, in computer science terms or
20 in computer programming terms, if you return the
21 index, you have the identifier.

22 Q. So does this return statement in
23 Pure Storage's source code that returns the
24 index to the identifier literally in your view

1 meet the claim language returning the
2 identifier?

3 A. Yes, it does. It returns the
4 identifier.

5 Q. Does Pure Storage agree with you
6 about whether returning the index literally
7 meets this claim step?

8 A. No, Pure Storage disagrees with
9 me.

10 Q. Have you heard of something called
11 the doctrine of equivalents?

12 A. Yes, I have.

13 Q. Is it your understanding that
14 under the doctrine of equivalents, an accused
15 product can meet a claim limitation even if it
16 doesn't meet it literally, as long as it
17 performs substantially the same function in
18 substantially the same way to achieve
19 substantially the same result?

20 A. Yes, that's my understanding.

21 Q. And do you have an opinion as --
22 about whether the return statement in Pure
23 Storage's source code that returns an index to
24 the identifier infringes this claim step under

1 the doctrine of equivalents?

2 A. Yes, I believe it does. Because
3 it does, performing substantially the same
4 function, it returns an index and it does do it
5 substantially the same way in that it returns
6 the index in the event that there's a match.
7 And the result is that you have an identifier
8 that you can use for other things, so
9 substantially the same result.

10 Q. And so if we now turn back to the
11 claims, can we summarize, do you have, in your
12 opinion, two reasons why you believe that the
13 returning the identifier step of Claim 32 is met
14 by Pure Storage's software in its FlashArray
15 products?

16 A. Yes, my opinion is it's infringed
17 in both ways that I stated, which is returning
18 the identifier, delivering back the identifier
19 to the SD table and in the return statement.

20 Q. So we'll put a checkmark up there.
21 And to summarize, is your opinion that Pure
22 Storage products infringe this claim?

23 A. Yes, my opinion is that Pure
24 Storage products infringe all of the elements of

1 claim 32 of the '464 patent.

2 Q. Mr. Jestice, do you have an
3 understanding that there are different acts that
4 can infringe a patent claim?

5 A. Yes, I do.

6 Q. Do you have an opinion about
7 whether Pure Storage infringes this claim by
8 making all of the accused FlashArray products in
9 the United States?

10 A. Yes, they do. They infringe by
11 making the products in the United States.

12 Q. And is it also possible to
13 infringe a patent claim by using or selling or
14 offering to sell the patented product in the
15 United States?

16 A. Yes. My opinion is that they
17 infringe the patent by making, selling and
18 offering to sell the products in the United
19 States.

20 Q. Okay. Mr. Jestice, now that we
21 have talked about infringement, I would like to
22 turn to the issue of noninfringing alternatives?

23 THE COURT: Mr. Rosenberg, I'm
24 thinking maybe this is a good time for lunch.

1 Is it?

2 MR. ROSENBERG: Absolutely.

3 THE COURT: Members of the jury,
4 we are going to take a one-hour lunch break now,
5 and then we'll resume at 12 minutes of 2:00.
6 All right. Let's take the jury out.

7 (Jury leaving the courtroom at
8 12:48 p.m.)

9 THE COURT: All right.
10 Mr. Jestice, you can step down.

11 Everyone be seated. Is there
12 anything that anybody wants to talk about?

13 MR. VAN NEST: No.

14 MR. KREVITT: None for the
15 plaintiff at this time, Your Honor.

16 MR. VAN NEST: We're okay, Your
17 Honor.

18 THE COURT: All right. Just in
19 terms of actually finishing Mr. Jestice, which I
20 assume will happen sometime this afternoon,
21 what's next?

22 MR. KREVITT: Mr. Birmingham, who
23 was the inventor on the '556 patent.

24 THE COURT: Okay. And do you

1 think that's going to take us through the rest
2 of the day?

3 MR. KREVITT: I'm not sure. Then
4 what we were thinking if not is that we would
5 move to Mark Jones, our expert on the '556
6 patent. Almost certainly that would take us to
7 the end of the day.

8 THE COURT: I think that's a
9 reasonable bet. All right. I'll see you all
10 again in a little less than an hour.

11 (A luncheon recess was taken.)

12 THE COURT: All right. Please be
13 seated. Are we ready to bring the jury in.

14 MR. VAN NEST: Your Honor, it's
15 awfully warm in here, I'm reflecting that for
16 everybody.

17 THE COURT: I noticed it when I
18 walked in and I have asked the deputy, courtroom
19 deputy to contact building management, offer
20 them more money and see if we can't lower the
21 heat.

22 MR. VAN NEST: Thank you.

23 (Jury entering the courtroom at
24 1:53 p.m)

1 THE COURT: Members of the jury,
2 welcome back. Everyone you may be seated. I'm
3 not sure if they turned the heat on while we
4 were out to lunch, but we are going to try to
5 get it lowered, but that takes a little bit of
6 time.

7 Go ahead, Mr. Rosenberg.

8 MR. ROSENBERG: Thank you, Your
9 Honor.

10 BY MR. ROSENBERG:

11 Q. Welcome back, Mr. Jestice. Before
12 lunch we were talking about infringement of the
13 '464 patent and your opinion that the Purity
14 software meets every step or element of claim 32
15 of the '464 patent.

16 I would like to turn now to a
17 separate issue called noninfringing
18 alternatives. Do you have an understanding of
19 what noninfringing alternatives are in a patent
20 case?

21 A. Yes. My understanding is that
22 they are suggestions in this case put forward by
23 Pure Storage of ways they could change their
24 products so they would not infringe the patents.

1 Q. These are not questions about
2 whether the actual designs of the products
3 infringe, but rather whether alternative designs
4 would have infringed; right?

5 A. That's correct.

6 Q. Have you considered whether Pure
7 Storage had available to it acceptable
8 noninfringing alternatives to the asserted
9 claims of the '015 and '464 patents?

10 A. Yes, I have.

11 Q. And what have concluded?

12 A. I concluded that they would still
13 infringe the patents of the '464 and the '015.

14 Q. And in order to help you explain
15 that, I know we have talked about the '464 and
16 your opinion on infringement. We have not
17 talked about the claims of the '015 patent. I
18 understand you're not here to offer an opinion
19 about infringement of that patent.

20 Is it your understanding that the
21 parties agree that there are claims of the '015
22 patent that are infringed?

23 A. Yes.

24 Q. To help explain your opinions

1 about whether the alternatives proposed by Pure
2 Storage would still infringe, I would like to
3 have you explain to the jury what the patent
4 claim of the '015 patent here says. Can you
5 tell us what the first part of claim 1 of the
6 '015 patent up there on the screen says and what
7 it means?

8 A. Yes. This is a method for storing
9 data comprising, receiving a data stream
10 comprising a plurality of data segments.

11 Q. Can you show us how that relates
12 to a data storage system, for example, the
13 illustration we have been using?

14 A. This is the same diagram I used
15 before with hosts on the left generating data,
16 an interface between them that transmits a data
17 stream which is a plurality of data segments and
18 then there is a controller and storage segments
19 that manage and store the data.

20 Q. And then moving back over to the
21 claim, after the data stream has been received,
22 what's the next step recited in claim 1 of the
23 '015 patent?

24 A. Assigning an identifier to one of

1 a plurality of data segments.

2 Q. How does that relate to the claim,
3 or I'm sorry, the illustration we see here?

4 A. This is exactly the same as
5 before, a segment comes into the storage
6 controller and an identifier, in this case it's
7 like a name tag, Ed we have associated with that
8 segment that contains the data, P2 for this
9 illustration.

10 Q. And the name tag, the identifier
11 here is Ed?

12 A. Ed, yes.

13 Q. And then the last step of claim 1
14 of the '015 patent is determining whether one of
15 the plurality of data segments has been stored
16 previously using a summary, wherein the summary
17 is a space efficient probabilistic summary of
18 segment information. Do you have an
19 understanding of how that step relates to the
20 concept of preliminary checks?

21 A. This is the preliminary check.

22 Q. When would that happen in an
23 example of a storage system?

24 A. Right here. It would take, it

1 would take the identifier and then use that as a
2 preliminary check to see if it's been stored
3 before.

4 Q. And Mr. Jestice, the Court has
5 provided constructions for some of the language
6 in the claim we just looked at; is that right?

7 A. Yes, they have.

8 Q. And we haven't looked at those
9 because of course you haven't offered and you
10 are not here to put in an opinion about whether
11 the products infringe, but I want to go back to
12 the word identifier here. Do you recall the
13 Court having construed the identifier to mean
14 information that identifies?

15 A. Yes, I do.

16 Q. And now moving forward to the
17 alternatives that Pure Storage has proposed, do
18 you understand this list to reflect alternatives
19 that Pure Storage, and specifically its expert,
20 Dr. Zadok, have proposed for ways in which Pure
21 Storage supposedly could have redesigned its
22 inline deduplication process to avoid infringing
23 the patents?

24 A. Yes. There is actually two sets

1 because they have offered two solutions, one for
2 the '015, one for the '464, so they're arranged
3 in two columns here.

4 Q. On the side on the left there
5 where it says the '015, these are things that
6 Pure Storage's experts says Pure Storage could
7 have done to change or redesign their inline
8 deduplication process to avoid the claim we just
9 looked at in the '015 patent; right?

10 A. That's correct.

11 Q. Are these changes things that Pure
12 Storage has actually done, has Pure Storage
13 actually made these two changes to its inline
14 deduplication products as far as you know?

15 A. As far as I know, they haven't
16 made these changes.

17 Q. In your opinion, if Pure Storage
18 had made either of those two changes to its
19 inline deduplication products, would that have
20 resulted in a noninfringing product with respect
21 to the '015 patent?

22 A. In respect to the '015 patent, no,
23 it still would have infringed.

24 Q. Why not?

1 A. Well, the first noninfringing
2 suggestion was assign hash values to multiple
3 sector blocks of data, there is nothing in the
4 patent that says that the sets have to be a
5 certain size, they can be 512 bites or any size.
6 They can also be variable. There is also no --
7 there is no reason that that has to be hash
8 values, why it would not work if hash values
9 were associated with multiple sectors.

10 Q. What about the second alternative
11 listed on the left side of the screen?

12 A. Again, in the patent it talks
13 about variable length sectors, and sliding
14 windows of data.

15 Q. And Mr. Jestice, has the fact that
16 Pure Storage has not actually changed its inline
17 deduplication process in either of those two
18 ways informed your opinion about whether they
19 would have been acceptable solutions?

20 A. I have some questions whether it
21 would work, but no, it hasn't changed my
22 opinion.

23 Q. So if you'll allow me, I'll put
24 strike marks through those to indicate your

1 opinion that those are not noninfringing
2 alternatives.

3 If we turn to the '464 patent, on
4 the right side here, is it your understanding
5 that these are ways in which Pure Storage's
6 expert says Pure Storage could have changed its
7 inline deduplication process to avoid infringing
8 the claim of the '464 patent we looked at
9 earlier, claim 32?

10 A. Yes, that's their suggestions were
11 changing the code so they would not infringe the
12 '464.

13 Q. Have you seen any indication that
14 Pure Storage has actually made any of these four
15 changes to its inline deduplication process?

16 A. No, I have not.

17 Q. So these are things Pure Storage
18 says it could have done, but Pure Storage did
19 not actually do?

20 A. Correct.

21 Q. In your opinion, if Pure Storage
22 had made these changes, any one of these changes
23 to its inline deduplication process, would that
24 have made the inline deduplication process an

1 acceptable alternative to the '464 patent?

2 A. No, it would not.

3 Q. Why not?

4 A. Well, the first choice, the
5 reverse order in which they are performed still
6 has the return statement. The modifying code to
7 eliminate recent stable and just rely the SD
8 table also still has the return statement.

9 The perform deduplication against
10 a single table stored in relatively high latency
11 memory, I believe would still require a hash
12 filter that would also be a subset of the
13 identifiers in the latency memory, so I think
14 that would infringe and still be a return
15 statement.

16 The suggestions for removing or
17 changing the code for return statement, I don't
18 believe actually does remove the return
19 statement. And you -- and the final suggestion,
20 because there is actually two suggestions in
21 there, would be a violation of coding standards.

22 Q. Mr. Jestice, if Pure Storage had
23 made the changes on the right side of the screen
24 there, has Pure Storage's expert expressed a

1 view that making those changes would do anything
2 to avoid infringing the '015 patent on the left?

3 A. No, the ones on the right have
4 been suggested for only the '464 patent.

5 Q. And it's your opinion that those
6 changes would not result in acceptable
7 noninfringing alternatives for the '464?

8 A. That's correct.

9 Q. I'll put a line through those to
10 illustrate that.

11 Other than what's listed on the
12 screen here, has Pure Storage's expert,
13 Dr. Zadok, proposed any other changes Pure
14 Storage could have made to its products to avoid
15 infringement?

16 A. Yes, he's proposed removing inline
17 deduplication completely.

18 Q. So not changing inline
19 deduplication in the ways described here, but
20 simply removing inline deduplication as a
21 feature?

22 A. Yes. He has discussed disabling
23 it, but ultimately he would remove all the code
24 from the Purity software.

1 Q. And do you think that taking out
2 or disabling or removing the inline
3 deduplication feature from the Pure Storage
4 products would have been an acceptable
5 alternative to using inline deduplication under
6 the claims?

7 A. I don't believe it would be
8 acceptable.

9 Q. And earlier you had discussed some
10 advantages that inline deduplication has over
11 background deduplication. Do those advantages
12 relate to your opinion about whether taking
13 inline deduplication out would have been an
14 acceptable alternative?

15 A. Yes. The end result of taking
16 inline deduplication out would be that the data
17 would initially be written to the storage
18 element and that causes using more storage and
19 secondly it would wear the storage out faster,
20 so neither of -- both of those things would
21 increase the price of the product.

22 Q. And so taking inline deduplication
23 out and relying only on background deduplication
24 in your view wouldn't have been an acceptable

1 way to make a product; is that right?

2 A. That's correct.

3 Q. Okay. You understand that Pure
4 Storage's expert witness, Doctor Zadok,
5 disagrees with you about that?

6 A. Yes, he does.

7 Q. Okay. Have you seen any
8 information from Pure Storage outside the
9 courtroom that reinforces your view that taking
10 inline deduplication out of the products would
11 not have been acceptable?

12 A. Yes, I have.

13 Q. Okay. Do these statements relate
14 to your views on that?

15 A. Yes. This is.

16 MR. VAN NEST: Objection. Your
17 Honor, 702. This is not expert testimony.

18 MR. ROSENBERG: It is, in fact,
19 Your Honor. Relates to the question of whether
20 this technology is essential, mandatory, key,
21 such that removing it would not result in an
22 acceptable product.

23 THE COURT: I'm going to overrule
24 the objection.

1 BY MR. ROSENBERG:

2 Q. So Mr. Jestice, can you remind us
3 who is Scott Dietzen.

4 A. He is the CEO of Pure Storage.

5 Q. What has he said in these blog
6 posts that you find relevant to your opinion
7 about whether taking inline deduplication out of
8 Pure Storage's products would have been an
9 acceptable alternative?

10 A. He says deduplication is key.
11 Inline deduplication is essential and inline,
12 submillisecond deduplication is mandatory.

13 Q. And what does this indicate to you
14 about whether Pure Storage's view about whether
15 taking inline deduplication out of the product
16 would have been an acceptable alternative?

17 A. They don't think it would have
18 been acceptable.

19 Q. In addition to these blog posts --
20 let me stop and have you look at Exhibit 31.

21 A. PTX-31?

22 Q. 31.

23 A. Yes, I have it.

24 Q. And is this the blog post shown on

1 the left side of the slide?

2 A. Yes, it is.

3 Q. Okay.

4 MR. ROSENBERG: Your Honor, we'd
5 move PTX-31 into evidence.

6 MR. VAN NEST: I have no
7 objection, Your Honor, to the admission of the
8 exhibit, but I do object to using an expert to
9 perform this task, 702.

10 THE COURT: So the exhibits are
11 admitted without objection and the rest, any
12 objection is overruled.

13 MR. ROSENBERG: And Your Honor,
14 likewise, maybe to speed this along, we move
15 into evidence the other two blog posts listed
16 here, Exhibits 33 and 38.

17 MR. VAN NEST: No objection, Your
18 Honor.

19 THE COURT: All right. Admitted
20 without objection.

21 BY MR. ROSENBERG:

22 Q. Mr. Jestice, in addition to the
23 information Mr. Dietzen wrote on the Pure
24 Storage blog, did you also review Mr. Dietzen's

1 deposition in this case?

2 A. Yes, I did.

3 Q. And did he say anything in his
4 deposition that you believe supports your view
5 that removing inline deduplication from Pure
6 Storage's products would not have been
7 acceptable?

8 A. Yes, I did.

9 Q. And is this one of the statements
10 he made in his deposition that you believe is
11 consistent with your opinion?

12 A. Yes, he says deduplication is one
13 of the essential techniques.

14 Q. Mr. Jestice, here Mr. Dietzen is
15 only using the word deduplication, he doesn't
16 say inline deduplication, right?

17 A. That's correct.

18 Q. And there are two different kinds
19 of deduplication, inline and background, right?

20 A. Yes, there is.

21 Q. And the one we're talking about
22 potentially removing here and whether that would
23 be acceptable was inline deduplication, right?

24 A. That's correct.

1 Q. And so how do you know that this
2 statement by Mr. -- I'm sorry, Doctor Dietzen is
3 consistent with your view that Pure Storage
4 views inline deduplication as an essential
5 technique? Is there any information in Pure
6 Storage's documents that supports your
7 understanding?

8 A. Yes, there is.

9 Q. And is this one of the documents
10 you reviewed that you believe supports your
11 understanding of that statement?

12 A. Yes, it is.

13 Q. Can you explain how this document
14 supports your understanding of doctor Dietzen's
15 testimony?

16 A. Yes, this is a Pure Storage
17 document and it says content deduplication with
18 512 byte geometry is roughly 95 percent.

19 Q. Is roughly 95 percent inline?

20 A. Inline and the remainder is done
21 post-process, which is background.

22 Q. Okay. And so is it your
23 understanding that Pure Storage is saying here
24 that of the data that is deduplicated by the

1 deduplication features in the FlashArray, 95
2 percent of that data deduplication happens
3 through the inline feature and not the
4 background feature?

5 MR. VAN NEST: Objection.

6 Document speaks for itself. Calling for
7 speculation.

8 THE COURT: All right. Overruled.

9 THE WITNESS: When I read that
10 document, that's what it says. It's 95 percent
11 inline.

12 BY MR. ROSENBERG:

13 Q. And Mr. Jestice, did you also
14 review testimony by a Pure Storage executive
15 name Matt Kixmoeller?

16 A. Yes, I did.

17 Q. And did any of his testimony
18 support your opinion?

19 A. Yes, it did.

20 Q. Can you please move the slide
21 forward? And is this testimony given by Mr.
22 Kixmoeller that you believe supports your
23 opinion?

24 A. Yes, he said inline deduplication

1 is one of the mandatory features.

2 Q. And so this is Pure Storage
3 talking about it's own products, correct?

4 A. Correct.

5 Q. And did you review any Pure
6 Storage documentation as opposed to the
7 testimony or the public facing blog posts, any
8 Pure Storage presentations that support your
9 view about removing inline deduplication?

10 A. Yes, I did.

11 Q. And is this one of the
12 presentations you reviewed?

13 A. Yes, it is.

14 Q. Can you explain how this supports
15 your view that removing inline deduplication
16 would make the Pure products unacceptable?

17 A. This presentation is saying what's
18 the secret sauce. And it's global inline
19 deduplication.

20 Q. Mr. Jestice, were you in the
21 courtroom earlier today when Doctor Li talked
22 about the commercial success that Data Domain
23 had?

24 A. Yes, I was.

1 Q. And do you understand that the
2 patents, the deduplication patents, the '015 and
3 the '464 Patents came out of the work that
4 Doctor Li and his colleagues did at Data Domain?

5 A. Yes, that's my understanding.

6 Q. Okay. Do you have an opinion
7 about whether Data Domain's own products, the
8 deduplication products sold by Data Domain
9 practice the '015 and '464 patents?

10 A. Yes. I've looked at the
11 documentation and my opinion is is that the --
12 these main products do implement the '015 and
13 '464 Patents.

14 Q. Did you look at products dating
15 back to -- let me scratch that. When you were
16 here earlier and heard Doctor Li testify, did
17 you hear him testify about the first products
18 Data Domain released in 2003 or 2004?

19 A. Yes.

20 Q. And is your opinion that the Data
21 Domain products practice the '015 and '464
22 Patent, does that encompass the Data Domain
23 products that were sold starting in 2003 and
24 2004?

1 A. Yes, it does.

2 Q. And does that extend to Data
3 Domain products that were sold up until and
4 through when EMC purchased Data Domain?

5 A. Yes, it does.

6 Q. Okay. And does it include Data
7 Domain's products up until the present day?

8 A. Yes, it does.

9 Q. And is it your opinion that the
10 Data Domain products practice the claims of the
11 '015 Patent that are at issue in this lawsuit,
12 specifically claims 1, 2, 7, 15, and 16 of the
13 '015 patent?

14 A. Yes, that's my opinion.

15 Q. And is it also your opinion that
16 the Data Domain products practice Claim 32 of
17 the '464 Patent, the patent you showed us
18 earlier how Pure Storage infringes?

19 A. Yes, that's my opinion.

20 Q. And in reaching your opinion that
21 Data Domain's products practice these patents,
22 did you consider any documentation about the
23 Data Domain products?

24 A. Yes, I did.

1 Q. Did you consider a Data Domain
2 technology and architecture overview?

3 A. Yes, I did.

4 Q. Can you turn to Exhibit 47 in your
5 book?

6 A. Okay.

7 Q. 47. Is this the Data Domain
8 technology and architecture overview that you
9 reviewed when reaching your opinion that Data
10 Domain's products practice patents?

11 A. Yes, it is.

12 MR. ROSENBERG: And Your Honor,
13 we'd move Exhibit 47 into evidence.

14 MR. VAN NEST: No objection, Your
15 Honor.

16 THE COURT: Admitted without
17 objection.

18 BY MR. ROSENBERG:

19 Q. And did you also consider in
20 forming this opinion a Data Domain document
21 entitled compressed object store architectural
22 specification?

23 A. Yes, I did.

24 Q. Can you turn to Exhibit 65 in your

1 binder, I think it's the next one. And is this
2 the architectural specification you reviewed?

3 A. Yes, it is.

4 MR. ROSENBERG: Your Honor, we'd
5 move Exhibit 65 into evidence.

6 MR. VAN NEST: No objection, Your
7 Honor.

8 THE COURT: Admitted without
9 objection.

10 BY MR. ROSENBERG:

11 Q. And in addition to this
12 documentation about Data Domain's products, did
13 you also consider testimony by the chief
14 architect at Data Domain, Mahesh Kamat, about
15 how the Data Domain products have worked?

16 A. Yes, I did.

17 Q. And do you believe his testimony
18 supports your opinion that the Data Domain's
19 products practice the asserted claims?

20 A. Yes, I do.

21 Q. And you mentioned you were here
22 for Doctor Li's testimony about the commercial
23 success of Data Domain. In your opinion, was
24 the deduplication technology embodied in the

1 asserted claims of these patents and practiced
2 by the Data Domain products the cause of the
3 commercial success of Data Domain's products?

4 A. That's my opinion, yes.

5 Q. Mr. Jestice, have you seen
6 statements by anyone in the storage industry
7 that you believe support your view that the
8 inline deduplication technology invented at Data
9 Domain is an important technology in this
10 industry?

11 A. Yes, I have.

12 Q. Have you seen statements by Frank
13 Slootman?

14 A. Yes, I have.

15 Q. Who is Frank Slootman?

16 A. He was CEO of Data Domain, and I
17 believe he's now on the board of directors of
18 Pure Storage. And he wrote a book called Tape
19 Sucks.

20 Q. And did you read that book?

21 A. Yes, I did.

22 Q. And is there anything written by
23 Mr. Slootman in that book that you found useful
24 in reaching your opinion that the inline

1 deduplication technology that you've testified
2 was embodied in Data Domain's products is
3 important technology in this industry?

4 A. Yes, I do.

5 Q. And is this one of those
6 statements?

7 A. Yes. Frank Sloodman says that
8 Data Domain's landmark invention -- this was
9 Data Domain's landmark invention.

10 Q. And you believe that's consistent
11 with your view that the deduplication technology
12 claimed in the '015 and '464 Patents drove the
13 commercial success of Data Domain's products?

14 A. Yes, I believe Data Domain
15 implemented all of the patents and their
16 products' success was based on those patents.

17 Q. Mr. Jestice, has Pure Storage's
18 expert, Doctor Zadok, said that it would be
19 acceptable for Pure Storage to take inline
20 deduplication out of its products and not do
21 anything to substitute for its absence?

22 A. Yes, he has.

23 Q. Let me rephrase it. Is there
24 anything Dr. Zadok has said Pure Storage would

1 do, would want to do, would have to do to
2 substitute for the absent of inline
3 deduplication if they took it out?

4 A. Dr. Zadok said that you need to
5 increase the amount of storage to compensate for
6 the lack of inline deduplication.

7 Q. And did Dr. Zadok also take a look
8 at how frequently inline deduplication is
9 currently used in Pure Storage's FlashArray
10 products?

11 A. Yes. Pure Storage's FlashArray
12 products communicate back to Pure Storage with
13 statistics and information about their devices,
14 and Dr. Zadok put together some information
15 about which of the products ran inline
16 deduplication and which did not.

17 Q. And did he observe a certain
18 number of FlashArray products that he said were
19 not using the inline deduplication feature?

20 A. Initially he said there was six
21 that he had found on a particular day that did
22 not use the inline deduplication feature.

23 Q. And is it true that those six
24 FlashArrays never used inline deduplication?

1 A. No, that's not actually true.

2 Q. How many of them did use inline
3 deduplication?

4 A. Well, there is some information
5 provided that said that three of those at a
6 later date were actually running inline
7 deduplication.

8 Q. So of the six FlashArray devices
9 that Dr. Zadok looked at, three of them in fact
10 did use inline deduplication at some point?

11 A. At some point in time, yes.

12 Q. Were these the only six
13 FlashArrays that Dr. Zadok had access to
14 information about?

15 A. No, Dr. Zadok and the Pure Storage
16 has 1,600 FlashArrays.

17 Q. And of those 1,600 FlashArrays,
18 how many of them used inline deduplication?

19 A. All of them except for the three.

20 Q. So is that about 99 percent?

21 A. Yeah.

22 Q. Mr. Jestice, did these statistics
23 about how many FlashArrays use inline
24 deduplication and how many don't inform your

1 opinion about whether removing inline
2 deduplication would be acceptable?

3 A. Yes. If only three out of the
4 1,600 arrays had it disabled, and I don't know
5 why they were disabled and have not provided,
6 been given any information as to why they were
7 disabled, that indicates to me that the
8 customers think that inline deduplication is
9 really important.

10 Q. Mr. Jestice, has Dr. Zadok
11 estimated the amount of extra storage that Pure
12 Storage would need to add to its products in
13 order to make up for the lack of inline
14 deduplication if they took it out in his view?

15 A. Yes, he has.

16 Q. What has he said about that?

17 A. 6.58 percent.

18 Q. So his view is that if Pure
19 Storage took inline deduplication out of the
20 FlashArray products, Pure Storage could make up
21 for that by adding about six-and-a-half percent
22 additional storage capacity to its products?

23 A. That's what he says.

24 Q. Do you agree with that opinion?

1 A. No, I don't.

2 Q. Why not?

3 A. The data that we have been
4 provided with that's coming back from the
5 customers of these products is very limited.
6 And Dr. Zadok has taken and analyzed that data
7 and is considering an average usage through the
8 systems he's looked at.

9 And this comes back to a task
10 called capacity planning which is what I did at
11 IBM and what I did at my startup company. You
12 need to look at the peaks to find out the
13 maximum usage, and then add some percentage to
14 that. So his analysis was flawed because it --
15 when you considered the averages of some of the
16 products he looked at.

17 Q. Mr. Jestice, you said you need to
18 look at the peaks. Can you explain a little bit
19 more about what you meant by that?

20 A. Yes, there is two aspects when
21 you're trying to decide how much computer
22 storage you'll need. One is benchmarking, which
23 is how fast this system goes and how much it can
24 handle. The second is how much storage are you

1 going to need? How much data are you going to
2 need? And you generally project forward for
3 this.

4 So what you need to do is look at
5 the maximum amount of data you're expecting to
6 see and you can do that based on the maximum
7 amount of data that you have already received
8 and then project out future needs, but you got
9 to start looking at those peaks.

10 For example, if you were looking
11 to heat your house, you would look at the
12 coldest season of the year to find out how much
13 heating you need because it doesn't do any good
14 saying on average it's going to be 30 degrees
15 around here if you got some days that's going to
16 be zero. You need to be able to bring the
17 temperature up to a reasonable amount. The same
18 with capacity planning, you need to be able to
19 identify those cold days in order to provide
20 enough capacity to not stop the operations of
21 the computer.

22 Q. Mr. Jestice, did you make any
23 effort to account for the peaks and follow
24 Dr. Zadok's calculations, but consider the peaks

1 that you believe he left out?

2 A. Yes. I actually asked for some
3 more data to try and identify that peak time and
4 I was provided with some limited amount of data
5 and then considering that not all those
6 customers are going to hit peaks because it's
7 going to be a unique calculation for each
8 customer, I averaged out the peaks and came up
9 with a different peak.

10 Q. Did you come up with a figure
11 that's larger than six-and-a-half percent?

12 A. Yes, I did.

13 Q. Can you tell us what you came up?

14 A. In my estimation based on the
15 limited data we have is 25.1 percent.

16 Q. What are these percentages? Are
17 you saying that every FlashArray out there would
18 have to have 25 percent more storage than the
19 top of the line system or something else?

20 A. Each customer is going to be
21 unique based on their workload. I'm saying on
22 average customers are going to need 25.1 percent
23 more.

24 Q. In order to accommodate peak

1 demands on those customers?

2 A. As currently seen based on today's
3 data. You also got to factor in what their
4 future needs are, but based on today's data,
5 that's what they would need.

6 Q. Mr. Jestice, if Pure Storage had
7 to actually buy 25 percent more storage capacity
8 for each of its products, would Pure Storage be
9 able to sell an acceptable product for would its
10 customers be able to afford it?

11 A. Neither Dr. Zadok or Pure Storage
12 believe that to be true and I also don't believe
13 that to be true.

14 Q. Just to sum up your opinion here
15 on noninfringing alternatives, Pure Storage and
16 Dr. Zadok proposed some changes that Dr. Zadok
17 believes Pure Storage could have made to keep
18 inline deduplication, but do it differently; is
19 that correct?

20 A. That's correct.

21 Q. And it's your opinion that if Pure
22 Storage had made those changes, that would not
23 have resulted in an acceptable noninfringing
24 alternative; is that correct?

1 A. That's correct.

2 Q. And Dr. Zadok also suggested that
3 Pure Storage could have removed inline
4 deduplication completely to the FlashArray; is
5 that correct?

6 A. That's correct.

7 Q. Is it your opinion that that would
8 have resulted in an unacceptable alternative?

9 A. That's correct.

10 MR. ROSENBERG: Thank you very
11 much, Mr. Jestice.

12 THE COURT: Cross-examination.

13 MR. VAN NEST: May I have just a
14 moment, Your Honor?

15 THE COURT: Yes.

16 MR. VAN NEST: Your Honor, I have
17 some binders for Mr. Jestice. May I pass them
18 out?

19 THE COURT: Sure.

20 MR. VAN NEST: May I proceed, Your
21 Honor?

22 THE COURT: Yes

23 CROSS-EXAMINATION

24 BY MR. VAN NEST:

1 Q. Good afternoon, Mr. Jestice.

2 A. Good afternoon.

3 Q. You frequently serve as an expert
4 witness in cases like this; correct?

5 A. I don't know about frequently. I
6 do.

7 Q. You do. The resume you provided
8 shows about forty different expert assignments
9 over the past several years?

10 A. Over the last fifteen years, yes.

11 Q. And, in fact, you do it enough
12 that you have an agency that represents you as
13 an expert; correct?

14 A. Actually I think like most experts
15 I have several agencies that represent me.

16 Q. And those agencies help you find
17 and then manage expert assignments; right?

18 A. Yes.

19 Q. And they get a cut of whatever
20 you're paid by EMC for that service?

21 A. Yes, they do.

22 Q. And you're represented by an
23 agency in connection with this case as well?

24 A. Yes, I am.

1 Q. And over the course of your expert
2 work through agencies and otherwise, you have
3 actually testified about many different types of
4 products, fields and technologies; correct?

5 A. I have testified about software 99
6 percent of the time.

7 Q. You have testified about home
8 appliances?

9 A. Can you tell me which case?

10 Q. It was spin dryers?

11 A. That was software.

12 Q. Softwares that run home
13 appliances?

14 A. That's correct.

15 Q. And the game programing?

16 A. Software that runs a game program,
17 yes.

18 Q. LED monitors?

19 A. Which case was that?

20 Q. I believe it's listed on your
21 resume, LED monitors was Faulk versus TPV.

22 A. For that case I wrote software to
23 measure the latency of an LED, yes.

24 Q. In any event, you testified about

1 a wide range of products over the course of your
2 career; correct?

3 A. I testified on software for a wide
4 range of products, that's correct.

5 Q. And this is not the first time
6 that you have served as an expert for EMC, is
7 it?

8 A. No, it's not.

9 Q. You have testified in four
10 different cases just for EMC alone; right?

11 A. That's correct.

12 Q. And over the course of those
13 cases, all of them, you have earned several
14 hundred thousand dollars as an expert witness;
15 correct?

16 A. That's correct.

17 Q. So they have become a good repeat
18 customer for you?

19 A. EMC doesn't generally pick me, I'm
20 picked from the agency.

21 Q. But the agency has picked you for
22 four separate EMC cases; correct?

23 A. Different agencies pick me for
24 different cases.

1 Q. Now, you have never actually
2 published a paper on storage or storage systems
3 in any sort of peer reviewed journal, have you?

4 A. No, I haven't.

5 Q. You have never taught a course at
6 college or university about storage?

7 A. Not a college or university, no.

8 Q. And you have never attended the
9 FAST conference that we heard Dr. Li testify
10 about this morning; right?

11 A. No, I have not.

12 Q. And as a matter of fact, that's
13 the conference that storage technologists and
14 executives attend each year?

15 A. I don't know anything about that
16 conference other than what I have read.

17 Q. That's something you're not even
18 familiar with; correct?

19 A. Correct.

20 Q. Now, let's get right to your
21 infringement opinions, Dr. Jestice. Obviously
22 in order to establish infringement, you need to
23 show that all of the elements of the claim are
24 present; right?

1 A. That's correct.

2 Q. And EMC as the plaintiff has
3 burden of proof in doing that?

4 A. Yes, they do.

5 Q. So if even one element is missing,
6 there is no infringement; correct?

7 A. That's correct.

8 Q. And you've given opinions here
9 today about claim 32 of the '464?

10 A. Yes, I have.

11 Q. And you have given an opinion that
12 the Pure Storage products literally infringe
13 that claim; right?

14 A. Yes, I have.

15 Q. And to establish literal
16 infringement means that the limitation is met if
17 it exist in the product just in the way it
18 appears in the claim; right?

19 A. Yes, that's correct.

20 Q. So it can't be close, it's got to
21 be just the way described in the claim itself
22 for literal infringement; right?

23 A. Yes.

24 Q. Now, as we discussed, could I have

1 claim 32 up from DTX 18, please. You were here
2 when I gave my opening statement; right?

3 A. Yes, I was.

4 Q. And you heard me say this was the
5 significant element of this claim?

6 A. Yes.

7 Q. And this is the one that's in
8 dispute?

9 A. Yes, it is.

10 Q. And by the way, this element is
11 not in the other patent that you and
12 Mr. Rosenberg talked about, the '015 patent does
13 not have this element; right?

14 A. That's correct.

15 Q. This is unique to the '464?

16 A. Between the two, yes.

17 Q. And so again, if FlashArray does
18 not meet this limitation, there is no
19 infringement of claim 32 of the '464; right?

20 A. Yes, I agree.

21 Q. And the only claim that you're
22 asserting from this patent is this claim 32?

23 A. Yes, it is.

24 Q. So this is the only real issue on

1 infringement that our jurors have to resolve in
2 connection with at least the '464 patent; right?

3 A. That's correct.

4 Q. Now, the Court has defined for us
5 what returning the identifier means; right?

6 A. That's correct.

7 Q. And you have taken that definition
8 into account in performing your evaluation;
9 right?

10 A. Yes, I have.

11 Q. The term return or returning as
12 used in the patent means deliver back, or
13 delivering back; right?

14 A. That's correct.

15 Q. Let's go back to the claim,
16 please. That requires that the identifier
17 that's been assigned to the data segment be
18 returned and delivered back; right?

19 A. It says delivering back the
20 identifier, by the Court's claim construction.

21 Q. And you have pointed to a
22 multistep process in Pure's device that you say
23 satisfies this claim limitation; right?

24 A. That's correct.

1 Q. And that process involves checking
2 and then updating the SD table, right?

3 A. It involves checking the SD table,
4 checking the recent table and then updating the
5 SD table.

6 Q. All right. Can we pull up Mr.
7 Jestice's slide from this morning's
8 presentation? I want to get one of your
9 graphics up, Mr. Jestice, so we know. This is
10 what you presented, part of what you presented
11 to our jurors this morning, right?

12 A. Yes, that's correct.

13 Q. And what you show is in this
14 example the identifier is the name tag, hello
15 Ed, right?

16 A. Yes.

17 Q. And this is sort of, I don't want
18 to demean it, but sort of a cartoon to show
19 what's happening in the Pure Storage device?

20 A. Yes, it is.

21 Q. You didn't actually show us any
22 source code in connection with your testimony?

23 A. No.

24 Q. Right. But in order to understand

1 how the device works, you'd have to look at
2 source code ultimately, right?

3 A. Yes.

4 Q. And the source code is what the
5 engineers use to write the programs that operate
6 the system, right?

7 A. That's correct.

8 Q. And that's one of the things you
9 looked at in forming your opinions?

10 A. That's correct.

11 Q. Now, it's true, isn't it, that at
12 the start of this process the identifier is not
13 actually in the SD table, correct?

14 A. It's not stored in the SD table,
15 that's correct.

16 Q. May I have the laser pointer,
17 please. So here's the SD table and here's the
18 recent table. At the start of this process that
19 you have described as constituting the
20 infringement, the identifier is not stored in
21 the SD table, correct?

22 A. That's correct.

23 Q. And you're showing an arrow from
24 the SD table to the recent table. That's arrow

1 two. Do you see that?

2 A. Yes, it is.

3 Q. Actually the SD table can't send
4 anything anywhere, it's just a memory, right?

5 A. I didn't say that it was sending
6 anything anywhere.

7 Q. Okay. So you didn't mean to imply
8 by this arrow labeled two, that this identifier
9 was actually moving from this table to this,
10 right?

11 A. The Purity software is moving its
12 focus from the SD table to the recent table.

13 Q. But the SD table itself isn't
14 sending anything anywhere, right?

15 A. The SD table is a table, it's not
16 capable of sending anything anyway.

17 Q. Right. And the recent table, it's
18 a table too, it's not capable of sending
19 anything anywhere either?

20 A. I didn't say it was.

21 Q. Right. So this arrow you're
22 showing as running from the recent table back to
23 the SD table, it's not actually sent there by
24 the recent table because the recent table can't

1 send anything anywhere, right?

2 A. It's the Purity software that is
3 going from the SD table to the recent table and
4 then back to the SD table.

5 Q. But these arrows aren't intended
6 to reflect movement between these tables, right?

7 A. Yes, they are.

8 Q. Well, let me back up a minute.
9 They are not intended to reflect that the SD
10 table sends anything anywhere, right?

11 A. They are intending to reflect that
12 the Pure Storage software, the Purity software
13 is moving and checking first in the SD table,
14 then the recent table and then the SD table.

15 Q. Okay. So let's get this clear for
16 our jurors. The Purity software is operated by
17 the controller in the Purity device, right?

18 A. Yes, it is.

19 Q. That's what performs all these
20 functions, the controller?

21 A. Yes, it is.

22 Q. These tables can't do any
23 comparing of anything because they are just
24 tables, right?

1 A. That's true.

2 Q. And they can't send anything
3 anywhere because they are just tables, right?

4 A. That's true.

5 Q. It's the Purity controller that's
6 doing the work?

7 A. The Purity software is doing the
8 work.

9 Q. Okay. As executed through the
10 controller?

11 A. And it's being executed through
12 the controller, yes.

13 Q. Now, I think you told us that at
14 the start of this process that you say
15 infringes, the identifier is not stored in the
16 SD table, correct?

17 A. That's correct.

18 Q. So that means when the update
19 happens, the identifier is being placed into the
20 SD table for the first time?

21 A. It is being -- well, yes, it's
22 being stored in the SD table for the first time.

23 Q. And it's being placed there by the
24 operation of the controller on the software,

1 correct?

2 A. By the Purity software it's being
3 placed there, yes.

4 Q. Right. But it's being placed
5 there for the first time?

6 A. As far as we know, yes.

7 Q. And you call that delivering back,
8 right? That's your opinion?

9 A. That's my opinion.

10 Q. Okay. But you concede, one, it
11 was not in the SD table to begin with, correct?

12 A. I agree, yes.

13 Q. And two, when it is updated there,
14 that's the first time it's being returned
15 anywhere?

16 A. That's what I said, yeah, that's
17 my opinion.

18 Q. Now, actually there isn't much
19 dispute between you and Doctor Zadok about how
20 the system works, correct?

21 A. If there is it's very small.

22 Q. All right. As a matter of fact,
23 there isn't really a technical dispute between
24 the two of you about how the software in the

1 system works, right?

2 A. There's a dispute about the
3 return.

4 Q. Indeed. Of course. Let me
5 rephrase it. In terms of how the software
6 operates in the device, you and Doctor Zadok
7 agree?

8 A. Yes.

9 Q. Okay. It's the interpretation of
10 that where the disagreement comes in, right?

11 A. Yes, it is.

12 Q. Now, and you prepared an opening
13 report in connection with your work on this
14 case, correct?

15 A. Yes, I did.

16 Q. And you understood the rules
17 required you to put your opinions out in
18 writing?

19 A. Yes.

20 Q. And to support them with whatever
21 information you needed?

22 A. Yes, I did.

23 Q. And to explain the bases for your
24 opinions, correct?

1 A. Yes.

2 Q. And in discussing this element of
3 infringement, you listed one line of code,
4 right?

5 A. Yes.

6 Q. Could we have paragraph 181 from
7 Doctor Jestice's opening report, paragraph 181.
8 I think it's the next paragraph. It's 180. I'm
9 sorry. My fault. This is the paragraph from
10 your opening report in which you discuss this
11 process, correct?

12 A. I was just going to check.

13 Q. I handed you your report. That's
14 your opening report. It should be in there at
15 paragraph 180.

16 A. Okay. I'm there.

17 Q. Okay. And very last -- can you
18 identify the very last sentence?

19 A. Yes.

20 Q. That's the one line of code and
21 the only line of code that you cited in
22 connection with this element of your analysis in
23 your opening report, correct?

24 A. In my opening report, that's

1 correct.

2 Q. And then Doctor Zadok got a chance
3 to do a report, correct?

4 A. Yes.

5 Q. And he wrote several paragraphs
6 describing how the source code operates the
7 deduplication function in Pure's software,
8 right?

9 A. Yes, he did.

10 Q. And he cited many of the modules
11 that are used to operate deduplication, right?

12 A. Yes.

13 Q. He cited the code?

14 A. I would have to go back and look
15 at his report, but most likely, yes.

16 Q. We can look at it, if you want.
17 Do you remember that he cited quite a bit of the
18 code from deduplication?

19 A. Yes, I do.

20 Q. Paragraph after paragraph of it,
21 right? Correct?

22 A. That's correct.

23 Q. Okay. And you didn't have any
24 disagreement with what he set forth as to how

1 the source code for deduplication works in Pure
2 Storage's device, right?

3 A. That's correct.

4 Q. You were in agreement when you
5 looked at all the source code that he laid out,
6 your conclusion was he's right, that's how it
7 works, correct?

8 A. Well, I was looking at the source
9 code in total, and yes, I agree.

10 Q. Okay. And one of the things that
11 you agree with in Doctor Zadok's report is that
12 none of the deduplication source code routines
13 that he identified directly return the actual
14 identifier value to their calling routine,
15 right?

16 A. I have to go back and look at the
17 references.

18 Q. Well, didn't you testify in your
19 deposition that after looking at all of Doctor
20 Zadok's analysis you agreed with his conclusion
21 that none of the source code in the
22 deduplication modules directly returns an actual
23 identifier to its calling routine?

24 A. So you're talking about a return

1 statement?

2 Q. That's right, I am.

3 A. Yeah, I agree.

4 Q. And you agree with that?

5 A. With the computer return
6 statement, yes.

7 Q. Okay. And you actually testified
8 that none of the duplication source code
9 routines identified by Doctor Zadok directly
10 return the identifier to its calling routine in
11 terms of a return statement, right?

12 A. That's correct.

13 Q. Now, you didn't actually show us
14 any source code this morning, right, during your
15 testimony?

16 A. That's correct.

17 Q. You showed us a graphic that said
18 return P, right?

19 A. It wasn't a piece of source code.

20 Q. Okay. Can we put up the graphic
21 that we saw this morning. Return (p). Now
22 that's not actually evidence; right?

23 MR. ROSENBERG: Objection, Your
24 Honor. Objection to that as argumentative.

1 THE COURT: I'm going to overrule
2 the objection.

3 THE WITNESS: It's just an example
4 of the return code, any return code.

5 BY MR. VAN NEST:

6 Q. But you actually identify in your
7 report some specific source code that you said
8 performed a return; right?

9 A. Yes.

10 Q. And that's the one line of code we
11 looked at this morning, or we looked at just a
12 moment ago?

13 A. That's correct.

14 Q. You didn't even show that to the
15 jury; right?

16 A. That's correct.

17 Q. And one reason for that is that
18 that code doesn't actually return the identifier
19 anywhere, it returns an index?

20 A. It returns an index as an
21 identifier.

22 Q. But it doesn't return an
23 identifier itself; right?

24 A. Yes, it does.

1 Q. Let's actually put up the source
2 code, I think it's in 905, DTX 905. Can we blow
3 that up a little bit.

4 So this is the source code, this
5 is the only line of code that you identified
6 anywhere in your various reports that you say
7 performs a return in connection with this claim;
8 right?

9 A. That's correct.

10 Q. And first off, in your report, you
11 didn't even explain what this return does, did
12 you?

13 A. That's correct.

14 Q. And you didn't even bother to tell
15 our jurors this morning what it does, either;
16 right?

17 A. That's correct.

18 Q. One thing we know for sure is that
19 this is not the code that updates the SD table;
20 right?

21 A. The code I was looking for was a
22 return of the identifier.

23 Q. My question was, Mr. Jestice, this
24 code is not involved in the update of the SD

1 table that you told us was the infringing
2 function; right?

3 A. It's completely separate.

4 Q. It's completely separate. So just
5 so there is no confusion, this code is not
6 involved in updating the SD table in Pure's
7 products; right?

8 A. That's correct.

9 Q. That means with respect to your
10 opinion about infringement, with respect to
11 updating the SD table, you haven't provided us
12 with any source code; right?

13 A. They're completely separate.

14 Q. But you haven't provided us with
15 any source code explaining how the SD table
16 update occurs?

17 A. That's correct.

18 Q. What you have shown us was the
19 cartoon that we saw on the screen a little bit
20 earlier?

21 A. That's correct.

22 Q. Now, obviously -- strike that.

23 You have also expressed an opinion
24 that this line -- let's put the line of code

1 back up because -- excuse me, we'll stay on it.

2 You've expressed an opinion that
3 this line of code constitutes infringement under
4 the doctrine of equivalents; right?

5 A. Yes, it does.

6 Q. Now, the doctrine of equivalents
7 is something that you can fall back on if there
8 is no literal infringement; right?

9 A. That's true.

10 Q. So normally if an expert believes
11 that it's certain that his opinion establishes
12 literal infringement, there is no need to resort
13 this to; right?

14 A. Dr. Zadok disagrees with me on my
15 interpretation.

16 Q. He disagrees with you on
17 everything; right?

18 A. He disagrees with me on return
19 statement.

20 Q. He disagrees with you on deliver
21 back; right?

22 A. That's the return.

23 Q. Well, I think we have established
24 this line of code doesn't update the SD table?

1 A. That's correct.

2 Q. Now, you understand that to
3 establish equivalents, you must show that the
4 accused feature is performing the same function
5 in the same way to get the same result; right?

6 A. Substantially the same function.

7 Q. Fair enough. Substantially the
8 same function, substantially the same way,
9 substantially the same result?

10 A. That's correct.

11 Q. So the requirement of the claim is
12 that you deliver back the identifier if a match
13 is found?

14 A. Correct.

15 Q. And the functionality that you
16 have identified in Pure Storage that you say
17 performs that is updating the SD table?

18 A. That's one way it infringes.

19 Q. Your opinion is this is a totally
20 separate different way that it infringes; right?

21 A. That's correct.

22 Q. Even though you haven't told us
23 what it does; right?

24 A. I have identified as the line of

1 code that returns the identifier.

2 Q. But again, all this code returns
3 is an index?

4 A. It returns the identifier as an
5 index.

6 Q. Now, at the time you formed your
7 opinion, did you even know what this line of
8 code served as in the deduplication process at
9 Pure?

10 A. Did I understand where it fits
11 into the system?

12 Q. Yes.

13 A. I could tell you, yes.

14 Q. But you certainly didn't describe
15 in your report what function it performed;
16 right?

17 A. I didn't need to describe in my
18 report, I'm identifying the code that does the
19 return.

20 Q. And, therefore, you didn't?

21 A. Correct.

22 Q. Now, apart from this line of code
23 and your opinion that updating the SD file
24 infringes, that's the limit of your reasons for

1 finding infringement of claim 32; right?

2 A. It's the last element of the
3 claim, the one that's in dispute.

4 Q. But we have covered the scope of
5 what you say constitutes that infringement, it's
6 this one line of code and the SD table update;
7 right?

8 A. That's correct.

9 Q. Nothing else; right?

10 A. Yes, I said that was correct.

11 Q. Now, you testified, Mr. Jestice,
12 that Data Domain products practice the '464 and
13 '015 patents; is that correct?

14 A. That's correct.

15 Q. Did you actually look at scores
16 code for the Data Domain products?

17 A. No, I did not. It wasn't
18 available to me.

19 Q. It wasn't available?

20 A. It was not made available to me.

21 Q. But the owners of that code are
22 EMC; right?

23 A. That's correct.

24 Q. That's who you're working for?

1 A. That's correct.

2 Q. Did you ask anybody to let you see
3 the source code from the Data Domain products?

4 A. The architectural specification in
5 this case were good enough.

6 Q. So you didn't need to look at the
7 source code?

8 A. Not for those products.

9 Q. And therefore, you didn't?

10 A. That's correct.

11 Q. And you didn't even ask?

12 A. That's correct.

13 Q. So it's not that they weren't made
14 available as you just told me, it's that you
15 didn't ask for them; right?

16 A. That's correct.

17 Q. Now, you understand that Data
18 Domain doesn't manufacture any storage device
19 today that's all Flash; right?

20 A. That's my understanding.

21 Q. They manufacture the older
22 variety, magnetic spinning disks. Different
23 variety?

24 A. Different.

1 Q. They're not in the all-Flash
2 market?

3 A. They're not.

4 Q. And as a matter of fact, their
5 primary market is backup rather than primary
6 storage which is what Pure and XtremIO do?

7 A. Correct.

8 Q. Not only are they using a
9 different product, but they're in a different
10 market, too?

11 A. I'm not an expert in that field,
12 but I would agree with you.

13 Q. You're not an expert in marketing?

14 A. Correct.

15 Q. Now, have you ever analyzed
16 whether EMC's Flash product, XtremIO, practices
17 the patents?

18 A. No, I have not.

19 Q. So you don't have any opinion on
20 that?

21 A. No, I don't.

22 Q. And you weren't even asked by
23 anyone at EMC to analyze that; right?

24 A. That's correct.

1 Q. So based on all the work you have
2 done, no one at EMC has ever suggested to you
3 that their all-Flash product uses the '015 or
4 the '464 patent; correct?

5 A. That's correct.

6 Q. And the Data Domain patents that
7 you analyzed, the '015, the '464, they make no
8 mention of Flash at all; right?

9 A. Not specifically, no.

10 Q. Not even a general mention of
11 Flash?

12 A. Flash is a storage device.

13 Q. Now, I want to explore the last
14 opinion you expressed about capacity. You did a
15 capacity analysis; correct?

16 A. Well, yes.

17 Q. Now, capacity is ultimately a
18 question for customers; right?

19 A. Well, the customers know what data
20 they are creating, but they would work in
21 conjunction with a vendor to decide how much
22 storage they need.

23 Q. You mentioned that there is inline
24 deduplication and background deduplication in

1 Pure's devices?

2 A. Yes, there is.

3 Q. And if you turn the inline off,
4 the background processing will still run?

5 A. That's my understanding.

6 Q. And you're not accusing the
7 background process of infringement; right?

8 A. No.

9 Q. So background processing is a
10 non-infringing alternative, even in your view?

11 A. If you remove the inline dedupe
12 code, yes.

13 Q. Okay. So it constitutes a
14 non-infringing alternative that Pure could
15 elect, if it chose to do that and you would
16 agree that's non-infringing?

17 A. It's not an acceptable
18 non-infringing use.

19 Q. Fair enough, but it is a
20 non-infringing alternative, according to you,
21 based on the technical analysis you've done?

22 A. Yes, if you actually pull the
23 inline code, then it would not infringe.

24 Q. And that can be done, correct?

1 A. I don't know how to answer that.
2 Anything is possible.

3 Q. Well, customers and Pure can turn
4 inline off? In other words, as a technical
5 matter, it's not a hard technical challenge to
6 turn the inline deduplication off?

7 A. What you said was not correct.

8 Q. Well, let me put it this way. You
9 looked at some systems where the inline had been
10 turned off, right?

11 A. The inline can only be turned off
12 by Pure Storage.

13 Q. Right, but it's not difficult for
14 Pure Storage to turn it off?

15 A. No, that's true, but it's a
16 different scenario if you're actually going to
17 pull the code.

18 Q. In other words, it could be turned
19 off instead of pulled and Pure Storage has the
20 ability to do that?

21 A. But if it was turned off, it would
22 still infringe.

23 Q. Okay. So in your view, you have
24 to pull the inline code out?

1 A. Correct.

2 Q. Okay. But if you did that, it
3 would be non-infringing?

4 A. It would be non-infringing, but
5 not acceptable.

6 Q. Okay. And that's because you
7 believe that if the inline were out, the
8 customer would need 25 percent more capacity in
9 order to have an acceptable performing device,
10 right?

11 A. Based on the data that I've seen,
12 limited data, that would be the average need.

13 Q. And I want to analyze how you got
14 to that, because the comparable number that
15 Doctor Zadok came up with was about 6 percent,
16 right 6 and a half, 7, I think, right?

17 A. Yes, 6.57, I think.

18 Q. And you wanted to challenge, so
19 you asked Pure Storage to provide data from its
20 customers, right?

21 A. Yes.

22 Q. And what you asked for wasn't
23 average data, you asked for data for the 10
24 worst days in the year?

1 A. That's correct.

2 Q. Okay. So what you said was for 23
3 of these FlashArray devices, give me the very
4 worst day of the year from a standpoint of lots
5 of volume being processed, correct?

6 A. Actually I asked for a lot more
7 data.

8 Q. Okay.

9 A. But that's what we were given.

10 Q. But what you wanted was the worst
11 day, the highest day, because you're looking for
12 the peak?

13 A. That's what capacity planning is
14 about.

15 Q. So you got the 10 days?

16 A. We got a 10 days.

17 Q. And that was from 23 different
18 devices, right?

19 A. I don't remember the exact
20 details. We can go and check my report.

21 Q. We're going to go and do that in
22 just a minute. We'll do that. But you took
23 those 10 days, and you didn't average the 10,
24 you made a selection from within the 10 of 1 --

1 let me withdraw that. Let's go to paragraph 32
2 of Doctor Jestice's supplemental report. So
3 it's your supplemental report, Mr. Jestice. And
4 is there a chart? It might be in paragraph --
5 there it is. So I have up on the screen the
6 chart that I want to discuss with you, Mr.
7 Jestice.

8 A. I see it.

9 Q. From your report? That's from
10 your supplemental report?

11 A. I'm not at the supplemental
12 report.

13 Q. Okay. I'll represent to you that
14 that's in, I believe paragraph 34?

15 A. Oh, I see, okay, yes.

16 Q. Okay. So we put this together.
17 This is actually one chart that appears in your
18 report, correct?

19 A. Yes.

20 Q. And there are 23 entries on it,
21 because there were 23 separate arrays that you
22 got data for?

23 A. That's all we got, yes.

24 Q. Right. And the data that you got

1 was for a full day in each case?

2 A. Only one day, yes.

3 Q. And you got -- but you got -- you
4 got 10 days?

5 A. Yes.

6 Q. From each of the arrays?

7 A. Yes, out of the 8.

8 Q. So you didn't average those 10
9 days, right?

10 A. Absolutely not.

11 Q. And you didn't find the mean or
12 the middle of the 10 days, right?

13 A. Absolutely not.

14 Q. You took the absolute worst day
15 from the 10 worst days of the year?

16 A. Of course I did.

17 Q. Okay. And that's what's displayed
18 here. This is -- these represent the very worst
19 day out of the very worst 10 days of the data
20 you got?

21 A. That's how you do capacity
22 planning.

23 Q. And then you didn't even average
24 those or take the mean of those, right?

1 A. That's correct.

2 Q. You picked the highest five of the
3 23?

4 A. That's correct.

5 Q. Right. So rather than take the
6 1.6 percent or the 1.4 percent, the highlighted
7 ones are the ones you picked?

8 A. I'd have to go back and look why I
9 dropped the others, but yes, that's what I did.

10 Q. Okay. So you essentially took the
11 worst day of the worst 10 days and from that you
12 chose the worst five days out of all these
13 thousands of hours of information that you had,
14 right?

15 A. I don't know if it's thousands of
16 hours. From the limited information I had, I
17 picked the worst ones, because that's what
18 capacity planning is about.

19 Q. You started with the worst days
20 and you picked the worst one, and then you
21 picked the worst five out of those?

22 A. Yes, of course you do.

23 Q. Okay. And then you said well,
24 that's what I think everybody should buy,

1 something for the worst of the worst of the
2 worst, right?

3 A. No.

4 Q. You said that's the capacity you
5 need to meet, the peak?

6 A. That's the average capacity that I
7 estimated to meet the peak.

8 Q. And it's certainly not your --
9 you're not a marketing expert, right?

10 A. No, I'm not.

11 Q. You haven't talked to any Pure
12 customers?

13 A. No, I haven't.

14 Q. You don't know how Pure designs
15 their products?

16 A. No, I haven't.

17 Q. No. But does your opinion assume
18 that they'll build 25 more capacity for every
19 single one of the 1,600 customers regardless of
20 whether they need it or not?

21 A. They would analyze each customer,
22 which is what you would do as a capacity
23 planner, which is what I did, and I would make
24 recommendations to the customers for their

1 specific needs based on their work load and
2 projected work load, so the only information I
3 have is to average the very small amount of data
4 that Pure Storage would give me.

5 Q. But it's not your opinion that the
6 only way to make this noninfringing alternative
7 work is to sell every customer 25 percent more
8 storage; right?

9 A. No. I'm saying on average your
10 storage will have to sell 25 more storage for
11 their customers. Some will require more.

12 Q. And that average you got was
13 picking the ten worst days and selecting the
14 worst one of those and then the worst five of
15 those to get your number?

16 A. Absolutely. That's my job?

17 MR. VAN NEST: I have nothing
18 else, Your Honor.

19 THE COURT: Any redirect,
20 Mr. Rosenberg?

21 MR. ROSENBERG: Yes, Your Honor.

22 REDIRECT EXAMINATION

23 BY MR. ROSENBERG:

24 Q. Mr. Jestice, you see the 44

1 percent number at the top right-hand number of
2 the slide?

3 A. Yes, I do.

4 Q. So in the data provided by Pure
5 Storage, did you see instances in which it would
6 have taken more, in fact, more than twice what
7 you came up with in terms of extra capacity to
8 meet peak demand?

9 A. For that particular storage array
10 would have needed 44 percent.

11 Q. And what would happen to a
12 FlashArray customer if the FlashArray
13 experienced the peak demand that they didn't
14 have the capacity for?

15 A. They would get a message saying
16 I'm out of space.

17 Q. Would that be in your view
18 acceptable to the Pure Storage customer trying
19 to use that FlashArray?

20 A. If you were a large enterprise
21 customer that ran out of space, I think you
22 would have a serious conversation with your
23 capacity planner.

24 Q. Why in your opinion would Pure

1 Storage have needed to provide 21 percent more
2 storage on average for its customers if it had
3 taken inline deduplication out?

4 A. Because if you take the limited
5 data we had, I average out the worst case
6 because that's what you do in capacity planning.

7 Q. Mr. Jestice, I would like to turn
8 back to the questions Mr. Van Nest asked you
9 about the opinions you have about infringement.
10 Earlier today you told us about the two
11 different ways in which you believe the Purity
12 software performs the returning identifier step,
13 do you remember that?

14 A. Yes, I do.

15 Q. Is source code related to both of
16 those?

17 A. Source code is related to the
18 actual flow of data back into the SD table.
19 It's only important as far as Dr. Zadok saying I
20 need a return statement, which I found.

21 Q. Did you examine the Pure Storage
22 source code before you reached your opinions
23 about both of the kinds of infringement you
24 believe are occurring?

1 A. Yes, I spent multiple days looking
2 at source code.

3 Q. In fact, during your direct
4 examination today, didn't you identify for us
5 the name of the source code function that is
6 involved in what you consider to be delivering
7 the identifier back to the SD table?

8 MR. VAN NEST: Objection.
9 Leading, Your Honor.

10 THE COURT: Why don't you just
11 change the question to what is the --

12 BY MR. ROSENBERG:

13 Q. Mr. Jestice, did you identify for
14 the jury earlier today the source code function
15 or method that Pure Storage uses to deliver back
16 the identifier to the SD table?

17 MR. VAN NEST: Same objection,
18 Your Honor.

19 THE COURT: Ask him what it is and
20 you'll know whether he did it before.

21 Q. What is the name of the source
22 code function or method that in your view
23 returns the identifier to the SD table?

24 A. I identified two functions, one of

1 this is the hash tag look up, which is the
2 function that looks up the identifier tables and
3 compared dedupe which is the comparison of the
4 data that's been stored against the data that's
5 been received.

6 Q. And Mr. Van Nest asked you some
7 questions about your second theory or the second
8 way in which you expressed an opinion that Pure
9 Storage product meets the returning step. In
10 your opinion does the return statement that you
11 identified need to be related to the SD table in
12 order for Pure Storage software to meet the
13 returning step under that theory?

14 A. No, it does not.

15 Q. And in addition to that, do you
16 have a view about whether the asserted claim
17 here, in particular the returning the identifier
18 step, requires a return statement at all?

19 A. It does not.

20 Q. Mr. Jestice, Mr. Van Nest asked
21 you some questions about whether the table,
22 specifically the SD table and the reset table
23 send things. Do you recall that.

24 A. Yes, I recall that.

1 Q. Can we put up a slide with claim
2 32 of the patent. So if we actually look at the
3 returning the identifier step, what is it that
4 claim 32 requires to perform the step of
5 returning the identifier?

6 A. Can you rephrase?

7 Q. So actually I would like to look
8 if I can at the whole claim. At the very start
9 of the claim you see the language a computer
10 program product?

11 A. Yes.

12 Q. So did you explain to us earlier
13 what in laymen's terms the product that is
14 claimed by claim 32 is?

15 A. Yes.

16 Q. What is it?

17 A. This is the Purity software.

18 Q. So what in this claim has to
19 perform the step of returning the identifier?

20 A. The Purity software.

21 Q. Does the SD table have to perform
22 the step itself returning the identifier?

23 A. No, it does not.

24 Q. Does the resent table have to

1 perform the step returning the identifier?

2 A. No, it does not.

3 Q. Did you identify the code that you
4 believe is involved in the look ups and
5 returning the identifier?

6 A. Yes, I did.

7 Q. And Mr. Van Nest asked you also if
8 you had identified only one line of code in a
9 particular part of your report. Did you
10 consider only one line of code in Pure Storage's
11 source code before reaching your opinions about
12 infringement?

13 A. No, I spent multiple days looking
14 at source code in the process of reaching my
15 opinions.

16 MR. ROSENBERG: I have no further
17 questions. Thank you.

18 THE COURT: All right.
19 Mr. Jestice, you may step down.

20 MR. KREVITT: Ready for us to
21 proceed, Your Honor?

22 THE COURT: Yes.

23 MR. KREVITT: Your Honor, at this
24 time, EMC would call its next witness,

1 Mr. Michael Bermingham. He's coming. And
2 Mr. Poppe, my colleague, is going to be handling
3 this witness.

4 THE COURT: Sorry. Can you say
5 your name. I don't think the jury knows you.

6 MR. POPPE: Good afternoon. My
7 name is Matthew Poppe.

8 THE CLERK: Please state and spell
9 your full name for the record.

10 THE WITNESS: Michael Bermingham.
11 M-I-C-H-A-E-L, B-E-R-M-I-N-G-H-A-M.

12
13 MICHAEL BERMINGHAM,
14 the deponent herein, having first
15 been duly sworn on oath, was
16 examined and testified as follows:

17 MR. POPPE: Your Honor, may I
18 approach?

19 THE COURT: Yes, Mr. Poppe.

20 DIRECT EXAMINATION.

21 BY MR. POPPE:

22 Q. Good afternoon, Mr. Bermingham.

23 A. Good afternoon.

24 Q. Would you please state your name

1 and introduce yourself to the jury?

2 A. My name is Michael Bermingham.

3 Q. And you are an EMC employee; is
4 that correct?

5 A. That's correct.

6 Q. Why are you here to testify today?

7 A. I'm one of the inventors of the
8 '556 patent. And I'm here today to talk about
9 my invention.

10 Q. You have been handed a white
11 binder. If you could open that up and take a
12 look at Exhibit PTX 0005.

13 A. Okay.

14 Q. Is this a patent of which you are
15 an inventor?

16 A. Yes, it is.

17 Q. And that's the '556 patent?

18 A. Correct.

19 MR. POPPE: Your Honor, I would
20 like to offer Exhibit PTX 0005 into evidence.

21 THE COURT: All right. Admitted
22 without objection.

23 BY MR. POPPE:

24 Q. And in the upper left corner of

1 the cover page of the patent, do you see a
2 section called inventors?

3 A. Yes, I do.

4 Q. And is that your name listed as
5 the second inventor?

6 A. Yes.

7 Q. Who were the other two listed
8 inventors?

9 A. They're John Walton and Chris
10 MacLellan. We worked together.

11 Q. How long did you work together?

12 A. In general or on this patent?

13 Q. In general.

14 A. Probably over the course of five,
15 six years.

16 Q. What field of technology does the
17 '556 patent related to?

18 A. It relates to data storage
19 products.

20 Q. Is there a particular issue
21 associated with data storage products that the
22 patented invention addresses?

23 A. It deals with basically protecting
24 data, keeping it reliable and making sure it's

1 successful.

2 Q. Do you have any other patents?

3 A. Yes, I have nine other patents
4 with EMC.

5 Q. So we'll come back to the subject
6 of your '556 patent in a moment. First I'd like
7 to ask you a little bit about your personal
8 background. Where are you from originally?

9 A. Originally I'm from Ireland.

10 Q. And where do you live today?

11 A. I live in California. I've lived
12 in the US for several decades now. I lived in
13 Massachusetts in the east coast for a while, but
14 I'm currently in California.

15 Q. Did you go to college?

16 A. Yes.

17 Q. And where was that?

18 A. University of Limerick in Ireland.

19 Q. What did you study at that time?

20 A. I studied electronic engineering.

21 Q. Did you obtain any other degrees
22 after college?

23 A. Yes, I have a masters degree in
24 electrical engineering from Northeastern

1 University in Boston and I have an MBA from
2 Babson College in Wesley, Massachusetts

3 Q. That's a masters of business?

4 A. Correct, yes.

5 Q. Moving forward a few years from
6 your graduate degree, when did you first join
7 EMC?

8 A. I joined in 1993.

9 Q. That was so about 22 years ago?

10 A. Yeah, pretty much. I remember,
11 because my son was born the same year, '93, so
12 he's 22.

13 Q. What was your position at EMC when
14 you were hired?

15 A. Excuse me. I was hired as a
16 hardware design engineer focusing on ASIC and
17 memory design.

18 Q. What is an ASIC?

19 A. It's an acronym for -- means
20 applications specific integrated circuit.
21 Basically it's a computer chip.

22 Q. And when you refer to memory, is
23 that another kind of computer chip?

24 A. Yes.

1 Q. During your time at EMC in the
2 1990's and early 2000's, was there a particular
3 EMC product that you were working on?

4 A. Yes, I worked mainly on the
5 Symmetrix product. And that was basically it
6 was EMC's flagship storage product. We sold to
7 large customers, institution type customer like
8 financial institutions, banks and so forth as
9 their kind of primary massive data storage
10 system.

11 Q. And does EMC still sell the
12 Symmetrix products?

13 A. They do. It's currently branded
14 as VMAX.

15 Q. Your work on the invention of the
16 '556 patent was a few years after you joined
17 EMC; is that correct?

18 A. Correct.

19 Q. And what was your position in the
20 company at that time?

21 A. I have been promoted several
22 times. I was senior hardware engineer and team
23 lead for, responsible for memory subsystem
24 design for Symmetrix products.

1 Q. And when you say responsible for
2 design, can you say a little bit more about what
3 that meant at that time for you?

4 A. Yeah. I mean, our main focus
5 really was around how do we kind of improve, you
6 know, expand, enhance the Symmetrix products.
7 So our main focus was on next generation
8 architectures, so, you know, I think our key
9 responsibilities, our areas of focus were
10 reliability, performance and cost of the system.

11 Q. You said reliability, performance
12 and cost; is that right?

13 A. Correct.

14 Q. And when you say reliability, what
15 does that mean in this context?

16 A. Well, in the context of data
17 storage, what it really means is keeping
18 customers' data safe, making sure it doesn't get
19 lost or corrupted, making sure it's always
20 available to the customer in a timely manner.

21 Q. And what does performance mean in
22 this context when you used it to describe the
23 work you were doing?

24 A. Essentially speed, how quickly you

1 can store or retrieve data.

2 Q. And how do the issues of
3 reliability, performance and cost work together?

4 A. Well, essentially there, you know,
5 reliability and performance both cost cost.
6 They incur cost, right? So there's a balance.
7 You can develop the most, you know, very high
8 performing system, an extremely reliable system,
9 but in general adding reliability for data
10 storage means adding additional components,
11 adding redundancy, so all of that costs, so
12 there's a trade off there.

13 Q. All right. So we're talking about
14 your general position and responsibilities in
15 the early 2000's. Was that also around the time
16 that you ended up going to business school?

17 A. Correct, yes.

18 Q. And how did that come about?

19 A. Well, with my, you know, increased
20 responsibility, I became closer to, you know,
21 the business aspects of, you know, of the
22 technology and, you know, how it related to real
23 customer needs, so that was -- became a big
24 interest area for me. And you know, I'm always

1 interested in learning more, so it was a good
2 opportunity. EMC paid for my business school,
3 so, you know, I went -- I continued working at
4 EMC, I went to school at night and weekend.

5 Q. Was there a point in time in the
6 2000's when you left EMC?

7 A. Yes, I left in 2005. I had an
8 opportunity to go to a small company in
9 California doing something completely different,
10 so I took it up.

11 Q. And you eventually rejoined the
12 company, EMC?

13 A. Yeah, I rejoined in 2011, a
14 different department, different group, different
15 product, basically. You know, I was recruited
16 to come back to a company in Irvine, California,
17 that EMC had acquired several years earlier, so
18 it was a great opportunity and I was glad to
19 come back.

20 Q. So taking the two periods of your
21 employment together, you've been at the company
22 about 16 years, right?

23 A. 12, yeah, 16, 17 almost years,
24 yeah.

1 Q. And why have you stayed with the
2 company so far?

3 A. Well, they've been a good company
4 to work for. You know, I've done pretty well
5 there. It's a great kind of atmosphere, very
6 innovative, lots of innovative people. It's got
7 a great work/life balance. It's been named one
8 of the best companies to work in the US several
9 times, so it's -- it's been good for me and my
10 family.

11 Q. Let's turn now back to the '556
12 Patent and you mentioned that this patent
13 relates to protecting data; is that right?

14 A. That's right.

15 Q. During the period that you and
16 your co-inventors were working on the invention,
17 what technology was in use at that time in the
18 Symmetrix product to protect data in the part of
19 the product that you were responsible for?

20 A. Okay. So in the part or subsystem
21 of our product we used a technology called
22 mirroring.

23 Q. How did mirroring work to protect
24 data? And maybe we can pull up a slide of that.

1 A. Sure. Yeah. So in concept it's
2 pretty simple. So at this -- what this depicts
3 is a small example of data and in mirroring
4 essentially we make a second copy of it, so any
5 time we want to write into a storage system we
6 do write into a separate location or a separate
7 storage area, that way if anything happens to
8 either of the copies of the data, you know,
9 we're protected because we have a second copy we
10 can use.

11 Q. Does mirroring have any
12 disadvantages?

13 A. Yes. The primary disadvantage is
14 cost and space, so as you can see here, again,
15 we have three, you know, digits of bits of data
16 in this small example, so we have to double the
17 amount of storage we need, you know, with
18 mirroring. So here it looks kind of trivial, if
19 you can imagine a very large system with
20 billions of these bits, it adds up, so it can
21 cost in dollar costs of the memory devices and
22 also in just space of kind of keeping of this.

23 Q. Did this issue have any relation
24 to the work that you were doing in the tasks

1 that were assigned to you in the early 2000's
2 period at EMC?

3 A. Yes. So as I had mentioned, you
4 know, one of our prime responsibilities as a
5 team was developing, you know, the next
6 generation product and proving, you know, its
7 performance and reliability and trying to
8 achieve better cost. So in the case of the
9 memory system, you know, it was pretty costly.
10 We had very large, I mean physically, if you can
11 imagine, these systems are kind of refrigerator
12 sized and you have customers' data center is
13 potentially hundreds of these boxes. And the
14 memory system itself in, you know, one --
15 there's different versions of course, but in the
16 kind of central box it could consume somewhere
17 in some cases a quarter of the space, so what we
18 were looking at in the next generation was, you
19 know, a couple of things, how could we reduce
20 the cost of this memory. And the semiconductor
21 memory that we used had great benefits for
22 features and performance, but as I said, it did
23 cost. Also we were kind of up against it in
24 terms of we would love to have more memory or at

1 least more usable memory, but we really didn't
2 have any additional space in which to put it, so
3 that kind of brought us along the path of
4 exploring ways to get more efficient uses out of
5 the memory that we did have.

6 Q. And what idea along those lines
7 did you and your co-inventors have?

8 A. The basic idea was to use RAID
9 which is a, you know, an existing technology for
10 hard drives, use it for semiconductor memory.

11 Q. And let's bring up the next slide
12 if we could.

13 So the jury has heard a little bit
14 about RAID so far, but could you tell them using
15 the slide how RAID works?

16 A. Sure. So the idea is that we do a
17 mathematical operation called an exclusive R or
18 XR as it's abbreviated to generate an additional
19 bit. In this case we have the data word it's 1
20 0 0, and parity calculation essentially is it
21 wants to have an even number of ones in the
22 field. So in this example, we have 1 0 0, so
23 there is one 1, it's an odd number of ones so
24 the parity becomes one so that the overall

1 number of ones in this picture is even.

2 So for example, if the data had
3 two ones, if it was a 1 1 0, then the parity
4 would be zero, again to preserve the even number
5 of ones. That's the basic principle of parity.

6 Q. Let's go to the next slide and
7 maybe you can explain why all that math matters
8 and is useful?

9 A. So what that means is right, how
10 do we use that to protect our recover data. So
11 this example what we're showing the missing bit
12 here, we have lost or we corrupted a data, we
13 don't know what it is, it could be a one or a
14 zero. If you apply that parity operation or
15 that XR operation, it wants to have an even
16 number of ones. There is already an even number
17 of ones here, so therefore the missing has to be
18 a zero.

19 So it's kind of a trick if you
20 will, but it essentially, you know, protects,
21 you can recover the lost data from the parity
22 information.

23 Q. Do you have to start with three
24 pieces of data as in your example for this to

1 work?

2 A. No. No, this is -- typically you
3 would never use three, but typically these are
4 much larger data words verified over chunks of
5 data versus a single piece of data.

6 Q. Let's go to the next slide, if you
7 can explain why parity is better than mirroring?

8 A. So this is a summary of the two
9 pictures that we talked about. So on the left
10 is the mirroring picture and again we duplicated
11 the data, we have a data and we have a copy so
12 in this case it's six bits total. In the RAID
13 with parity case, we have only added an
14 additional one bit, so we need less storage for
15 the same type of protection.

16 Q. Is this basic RAID process
17 something that you and your co-inventors
18 invented?

19 A. No, RAID has been around for a
20 long time, applied to disk systems.

21 Q. What was it that you were trying
22 to do that you believed was new?

23 A. So what we invented was a means of
24 taking this approach and applying it to

1 semiconductor memories. Now, it's not as easy,
2 it wasn't a trivial problem, not as easy as
3 saying let's take RAID and put it in memories.
4 There are some pretty tough performance problems
5 you have to deal with in applying these RAID
6 type calculations and this parity calculation to
7 memory, so that's really what was novel about
8 what we did.

9 Q. So at some point in time, you and
10 your co-inventors had the idea of trying to use
11 RAID in semiconductor memory; is that right?

12 A. Yes.

13 Q. And what happened next to try to
14 figure out how to do that?

15 A. In terms of the process or how --

16 Q. Well, first maybe you can say how
17 long a process was that to figure out the
18 problem?

19 A. Sure. The way it kind of went,
20 you know, as we're trying to look at better or
21 more efficient use of the memory for the
22 semiconductor memory system, you know, we had
23 this idea of using RAID. So the next step was
24 kind of to say okay, would that really be

1 feasible with semiconductor memories and kind of
2 go through basically a whiteboarding session to
3 look at how this worked, what the kind of got
4 you maybe, you know, where there might be
5 performance issues or problems we might have to
6 work through.

7 So in total it probably took is
8 about a year to probably refine it to a point
9 where it really was workable. We weren't
10 working on it exclusively for a year, we had a
11 lot of other responsibilities and things to do,
12 but in the timeline was about a year to get it
13 done.

14 Q. And I apologize, it may be just
15 me, but can you pull your microphone a little
16 closer. I'm having trouble hearing.

17 A. Sure. Thanks. Better?

18 Q. That's better. Thanks.

19 A. Obviously I'm shorter than the
20 last person.

21 Q. And why was it a difficult problem
22 to solve how to do this in semiconductor memory,
23 why wasn't it whatever had been done before with
24 disks and using the same thing?

1 A. Yeah, that's a good question. I
2 think the problem really comes down to -- okay,
3 with RAID applied to disk systems, hard disks
4 which is where RAID is commonly used, it does
5 have an overhead. So to calculate the parity
6 information here requires, it's more -- it takes
7 more time than the mirroring. If you look at
8 the mirroring what you're doing, you're doing
9 two rights in parallel. In computing terms
10 that's a relatively easy operation.

11 For calculating parity in RAID,
12 you have to do multiple reads and writes and to
13 do the exclusive R operation, so it consumes,
14 it's got overhead.

15 Now in a disk system, that's not
16 as problematic because disks are inherently much
17 slower in semiconductor memory. As a matter of
18 fact, the reason why you would use, you know,
19 expensive semiconductor memory in a system like
20 this is to kind of overcome the performance
21 problems or limitations of drives.

22 The tough thing about it is now
23 you're dealing with memory that has, you know,
24 if you kind of mess with its performance

1 characteristics, right, by introducing overhead
2 and so forth, you can lose the benefits of
3 having the memory in the first place, so there
4 is a bit of a balance there.

5 And keep in mind the system, these
6 are pretty simple diagram of the concept, but
7 these systems were very large systems that had a
8 lot of parallel activity going on.

9 So to make sure you didn't kind of
10 block any accesses to the memories, there was
11 quite a bit of kind of analysis required and
12 kind of what we came up with really is the
13 solution was really to in how the memory itself
14 was organized and how to control structures
15 utilize the memory organization to kind of do
16 the RAID operations in parallel. So we kind of
17 hid some of the overhead so that it worked for
18 memory subsystem.

19 Q. And so in the end, you were able
20 to achieve the reliability of RAID without
21 hurting the performance; is that right?

22 A. Correct.

23 Q. Let's look at page 15 of Exhibit
24 5, PTX 5. And if you could expand claim 6 in

1 column 15 including the line numbers on the
2 right. Can you see that okay, Mr. Bermingham?

3 A. So part six here.

4 Q. If it's easier to use the document
5 in front of you, whatever works for you.

6 A. Sure.

7 Q. So if I can direct your attention
8 to lines 25 through 28. And first of all, you
9 understand claim 6 is one of the claims that EMC
10 is asserting against Pure Storage in this case?

11 A. Yes, I do.

12 Q. And just generally the portion of
13 the claim related to -- in lines 25 to 28 where
14 it talks about a parity segment and a logical
15 exclusive-or, is this relating to the RAID that
16 you discussed earlier?

17 A. Yes, exactly, that's the RAID
18 calculation that I mentioned.

19 Q. And then the application of RAID
20 to a semiconductor memory, if you look up at
21 line 17, and is there a reference to that
22 concept in line 17 where it says plurality of
23 semiconductor memory segments?

24 A. Yes.

1 Q. And then finally, can you direct
2 the jury to the portion of the claim that
3 relates to achieving the performance that you
4 talked about while at the same time implementing
5 RAID in a semiconductor memory?

6 A. So it's essentially the last
7 paragraph here showing each of the segments
8 included in a respective memory region may be
9 assigned a respective base memory different from
10 the other segments, that's kind of a key piece.

11 Q. And what was it about having
12 memory boards with respective memory regions and
13 memory segments and the other elements of this
14 last paragraph including the base memory address
15 that related to this goal of achieving
16 performance while implementing RAID in
17 semiconductor memory?

18 A. Right. So there was essentially a
19 system comprised of various memory boards which
20 were physically, you know, separate pieces of
21 hardware, and each board there were regions and
22 within each region there were segments. One of
23 the key pieces of the meaning of the base memory
24 address is used to essentially control the

1 mapping or the accesses across these different
2 areas. So we could facilitate the parallel
3 accesses. That's one piece of it.

4 The second major piece is in
5 dealing with when there is a failure situation
6 where you have to actually rebuild, kind of the
7 second example I had given where you got to do
8 the computation to figure out the missing data.
9 Once you do that, you want to take that rebuild
10 data and store it somewhere else so the next
11 time you need it, you don't have to suffer the
12 same performance penalty. So that's, you know,
13 essentially got to do with our using, you know,
14 the concept of memory segments and base
15 addresses.

16 Q. Just taking a base memory address
17 independently by itself, was that something that
18 you invented?

19 A. No.

20 Q. It was the combination that was
21 your invention?

22 A. Yeah. It was using that in the
23 context of this kind of distributed memory
24 system, and you know, parallel control access

1 that would allow us to do it.

2 Q. And in the experience that you had
3 encountering base memory addresses before this
4 invention, can you just describe that experience
5 and what, you know, what a base memory address
6 is in that context of your prior experience?

7 A. Essentially it refers to a kind of
8 an access method where you can, you know,
9 specify where a chunk of memory can be found and
10 located.

11 Q. And why is that useful?

12 A. It allows, among other things,
13 kind of virtual memory systems or physical to
14 logical translation. So what I am by that is
15 kind of maybe like in a computer system the
16 processing element is dealing with its own set
17 of addresses, so it wants memory, it has a
18 means, it kind of knows where memory is, but in
19 the physical system when things start going
20 wrong, you can kind of remap that without having
21 to burden the process or to know where things
22 are.

23 Q. And at the time that you and your
24 co-inventors developed the invention, what did

1 you believe the implications of the invention
2 were?

3 A. Well, we thought it had pretty
4 wide implications and we were trying to solve a
5 particular problem for a product at the time,
6 but it was clear to us that it was -- it had
7 pretty wide implications that this could
8 essentially be applied to any similar
9 semiconductor memory system that was looking
10 for, you know, more efficient reliability.

11 MR. POPPE: Thank you very much.

12 THE COURT: All right. Members of
13 the jury, despite the heat, you all seem to
14 still be alert, but let's not push it. So let's
15 take a break for 15 minutes and then we'll come
16 back and wrap up for the day. Take the jury,
17 out please.

18 All right. You can all be seated.
19 Is there anything you need to discuss?

20 MR. KREVITT: Not from us, Your
21 Honor.

22 MR. VAN NEST: I'm not sure if
23 we're going to get to Doctor Jones or not today.

24 THE COURT: I would think we'd get

1 started with him.

2 MR. VAN NEST: If we are, Mr.
3 Johanningmeier has some comments about slides
4 that we were shown.

5 MR. JOHANNINGMEIER: Your Honor,
6 we received some demonstratives last night that
7 they intend to use and they have some testimony
8 pulled from some witnesses who haven't been here
9 and who aren't designated. Now we understand
10 that experts can rely on hearsay, but we are
11 objecting to the fact that they are going to be
12 displaying testimony on the screen that comes
13 from -- and these aren't 30(b)(6)'s, these are
14 witnesses who just simply aren't here, so they
15 are -- they are using their expert to bring in
16 testimony and so we're objecting to that as
17 improper.

18 In addition there's one of the
19 slides where they've cut it down and excluded
20 the question and put it in ellipses and all
21 that. We have an objection to that. It's just
22 improper use of the expert to get testimony into
23 the record.

24 MR. POPPE: Your Honor, all of the

1 witnesses in question are Pure Storage engineers
2 who developed functionality and Doctor Jones is
3 simply going to be explaining how he, in support
4 of his opinions, he relied on meaningful
5 information about how these products work. He's
6 certainly not going to read the full extent of
7 what these Pure Storage engineers testified, but
8 it's reasonable for him to show the basis of his
9 opinions. And in the one case where there are
10 ellipses, it's simply because the engineer in
11 question, English was his second language,
12 understandably he had some stuttering and
13 repeating of words and we simply cleaned it up.
14 There's been no indication to us in the amount
15 of time that this has been raised that there's
16 anything misleading resulting from those
17 ellipses and it wouldn't be helpful for the jury
18 to see a bunch of uhs and stuttering.

19 THE COURT: Do I take it, Mr.
20 Johanningmeier, that your objection is not so
21 much that he relies on these statements to
22 support his opinions so much, but that he --
23 that they want to put the statements up on the
24 screen?

1 MR. JOHANNINGMEIER: That's
2 exactly it. It's the manner of presentation.
3 Basically we had a process for designating depos
4 and encountering and figuring out a way to get
5 the system and deal with objections and this is
6 sort of circumventing that and putting snippets
7 on the screen. The cut down one isn't just to
8 deal with English problems. He's taken a
9 question off the slide.

10 THE COURT: So pretty hard for me
11 to deal with that in the abstract.

12 MR. JOHANNINGMEIER: I understand.
13 I could hand it up if you'd like.

14 THE COURT: Well, I think -- how
15 many slides are we talking about, Mr.
16 Johanningmeier?

17 MR. JOHANNINGMEIER: I think it's
18 five or six. I mean, we told them we didn't
19 object to the people who were 30(b)(6)'s, but
20 the other ones, it's six slides. Some of these
21 witnesses will be here to testify later in the
22 case as well.

23 MR. POPPE: But he needs to
24 explain the basis for his opinion now.

1 THE COURT: All right. Well, he
2 can explain the basis without necessarily having
3 deposition excerpts up on the slides, right?
4 That's what we seem to be all agreeing.

5 MR. POPPE: He can and he
6 certainly will, but I think it's reasonable for
7 him to.

8 THE COURT: Well, let me just
9 think about that. I'll come back in a few
10 minutes, but I'm kind of inclined to think that,
11 for basically hearsay that I have a certain
12 amount of discretion as to what to do with it.
13 And having random statements from what I take to
14 be engineers being deposed in their personal
15 capacity, you know, seems to me to unnecessarily
16 call that out. Let me think about that for a
17 minute and I'll be back in a few minutes.

18 MR. JOHANNINGMEIER: Thank you,
19 Your Honor.

20 THE COURT: All right. Just
21 before we bring the jury in, Mr. Johanningmeier,
22 you have these six slides or whatever that you
23 object to?

24 MR. JOHANNINGMEIER: Yeah. Yes,

1 Your Honor, I do. May I approach.

2 THE COURT: Yes, please. Are they
3 the ones?

4 MR. JOHANNINGMEIER: I'll tell you
5 what numbers they are. It's numbers 16, 32, 20,
6 31, 33 and 34.

7 THE COURT: All right. I will
8 look at them as we head in -- as we proceed.

9 MR. POPPE: And I'll be sure not
10 to pull up a slide until you've approved it.

11 THE COURT: Thank you, Mr. Poppe.
12 All right. Let's get the jury.

13 All right. Thank you, jury.
14 Welcome back. Everyone may be seated. Mr.
15 Johanningmeier.

16 MR. JOHANNINGMEIER: I have a
17 binder to pass up to the witness. And Your
18 Honor, may I approach?

19 THE COURT: Sure. Yeah.

20 BY MR. JOHANNINGMEIER:

21 Q. Okay. Good afternoon, Mr.
22 Birmingham.

23 A. Good afternoon.

24 Q. Now, in your examination earlier

1 you mentioned you know an EMC employee named Mr.
2 Christopher McClellan, right?

3 A. I do know Chris, yes.

4 Q. And he's one of your co-inventors
5 on the '556 Patent, right?

6 A. Correct.

7 Q. And you know he was deposed in
8 this litigation concerning the '556 Patent,
9 right?

10 A. Yes.

11 Q. In fact, you met him shortly
12 before he was deposed, right?

13 A. I was on a conference call with
14 him.

15 Q. Now, have you reviewed his
16 deposition testimony since then?

17 A. No.

18 Q. Okay. Now, when you met with
19 Mr. -- when you had your call with Mr.
20 McClellan, you understood that he had been
21 picked by EMC to be the company's spokesperson
22 about the '556 Patent, right?

23 A. When I last met with him, I
24 believe that was prior to his being deposed.

1 Q. But you knew that he was going to
2 be deposed, right?

3 A. At that time I did not.

4 Q. Okay. And you haven't been
5 deposed in this case before, right?

6 A. Correct.

7 Q. Now, I think you said this already
8 but I want to talk about it a little bit because
9 you put up some slides about RAID and talked
10 about some of the advantages of RAID. You did
11 not invent RAID; correct?

12 A. Correct.

13 Q. RAID was invented by computer
14 scientists at Berkley in the '80s; right?

15 A. I believe that's correct.

16 Q. When did you first learn about
17 RAID technology?

18 A. Probably in the '80s I learned
19 about it.

20 Q. And have you ever looked at
21 scholarly papers about RAID?

22 A. I have read some articles and so
23 forth, yes.

24 Q. Could I show the witness DTX 528.

1 This is an image here, a picture of a patent.
2 Have you ever seen this particular article
3 before?

4 A. Not that I recall.

5 Q. So you wouldn't -- so we can take
6 that down.

7 Now, let's look at your patent
8 which is the '556 patent, DTX 5. And I want to
9 call up on the screen the background of the
10 invention and that's at column one and lines 24
11 to 29.

12 So now you see this paragraph
13 that's been highlighted here. The section of
14 the background of the patent talks about the
15 things that came before the invention; right?

16 A. Yes.

17 Q. So this patent says here that
18 EMC's own Symmetrix products applied RAID before
19 you filed for the '556 patent; right, it talks
20 about it in the background of the patent?

21 A. Yes. For the disks, correct.

22 Q. So Symmetrix had RAID technology
23 on the disk before the '556 patent that was
24 filed on August 9th of 2001; right?

1 A. Correct.

2 Q. And so, in fact, you didn't invent
3 the RAID with parity that was used on the disk
4 that you talked about in your exam; correct?

5 A. Yes.

6 Q. You didn't invent mirroring?

7 A. Correct.

8 Q. Have you heard mirroring referred
9 to as RAID 1, RAID Level 1?

10 A. Yes.

11 Q. And RAID with parity that you were
12 talking about, would you call that RAID Level 4
13 or 5, have you heard that before?

14 A. Yes, generally it's RAID 5.

15 Q. Let's go back to the cover of the
16 patent. Now this section of the patent I want
17 to call out under other publications, this is
18 the section of the patent that talks about prior
19 art publications; right?

20 A. Yes.

21 Q. So these are documents that came
22 before the patent; right?

23 A. Yes. Sorry. Correct.

24 Q. So there is one listed here from

1 author Holland and it's called Fast On-Line
2 Failure Recovery in Redundant Disk Arrays and it
3 was presented at the Fault-Tolerant Computing
4 Conference in 1993. Do you see that?

5 A. I do.

6 Q. Can we call up DTX 523 for the
7 witness. Now, does this appear to be a copy of
8 the Holland paper, the Fast on-Line Failure
9 Recovery in Redundant Disk Arrays from 1993?

10 A. Yes.

11 MR. JOHANNINGMEIER: I would ask
12 to move this into evidence.

13 MR. POPPE: Relevance, Your Honor.

14 THE COURT: Why are you moving
15 that.

16 MR. JOHANNINGMEIER: It's the
17 prior art of the patent. Maybe I could ask a
18 couple of questions to make that clear.

19 THE COURT: I'm just wondering
20 what's the disputed point that you're addressing
21 here?

22 MR. JOHANNINGMEIER: Your Honor,
23 the witness displayed some stuff about mirroring
24 and about parity on the board and so I wanted to

1 just clarify the things that are in the prior
2 art are not things that he invented.

3 THE COURT: He said that a number
4 of times already.

5 BY MR. JOHANNINGMEIER:

6 Q. I'll just ask you. The stuff you
7 put up about mirroring and about parity and the
8 benefits of one versus the other, this was all
9 stuff that was well-known in the prior art;
10 right?

11 A. That's correct.

12 Q. Now, you mentioned that you came
13 back into the EMC fold when your company was
14 acquired. What company were you working for at
15 the time?

16 A. No, I came back into EMC to join
17 the different division that had been acquired.
18 It was a company that was acquired by EMC, so I
19 was working for Western Digital prior to
20 rejoining EMC.

21 Q. What was that company that had
22 been acquired?

23 A. Called Avamar.

24 Q. Now, Avamar had made some

1 deduplication products in the past; correct?

2 A. Correct.

3 MR. POPPE: Objection. Beyond the
4 scope, Your Honor.

5 THE COURT: I'm going to overrule.
6 Wait. We're not talking about deduplication
7 here. So I'll sustain it.

8 MR. JOHANNINGMEIER: I'm sorry,
9 Your Honor, I'll move on.

10 BY MR. JOHANNINGMEIER:

11 Q. In your examination, you mentioned
12 the subsystem of the product that you had been
13 working on, I think you called it a memory
14 system, you said it was in the central box; is
15 that right?

16 A. Yes.

17 Q. And you mentioned system
18 semiconductor memory that was used there?

19 A. Correct.

20 Q. So that was SD ram or D ram memory
21 that you were talking about that was used in
22 that subsystem; right?

23 A. That was what we used, yes.

24 Q. It was not Flash?

1 A. Correct.

2 Q. And just to be clear, Flash is not
3 mentioned at all in the '556 patent; right?

4 A. I don't believe so.

5 Q. And there is nothing about the
6 patent that was directed to particularly for
7 Flash memory as opposed to some other kind of
8 memory; right?

9 A. No, it was semiconductor memory,
10 which is Flash is a type of semiconductor memory
11 as is D ram.

12 Q. There was no optimization, just
13 Flash, because Flash wasn't even mentioned;
14 right?

15 A. Right.

16 Q. Now, you talked a little bit about
17 base memory addresses. And, of course, you
18 didn't invent that concept; right?

19 A. Correct.

20 Q. And those are commonly used in
21 computer systems and they have been for a very
22 long time; right?

23 A. Yes.

24 Q. You said that one of the things

1 that they are used for is to control mapping to
2 facilitate parallel accesses; right?

3 A. Right.

4 Q. That wasn't just in your system
5 that they used for that, that's in lots of
6 systems of base memory addresses are used for
7 that; right?

8 A. Possibly.

9 Q. I think you mentioned that base
10 memory addresses are used in virtual memory
11 systems; is that right?

12 A. Yes.

13 Q. Do you know of any other
14 applications for base memory addresses?

15 A. I mean, I'm familiar with some
16 that I have dealt with which essentially is
17 remapping of memory between different physical
18 locations in general.

19 Q. So it's a very broad concept;
20 right? Is that fair?

21 MR. POPPE: Objection. Vague.

22 THE COURT: I'm going to overrule
23 it. Can you rephrase the question?

24 Q. I said base memory address is a

1 concept that has very broad applicability;
2 right?

3 A. Sorry, yes.

4 Q. So it could be applied to lots of
5 different things; right?

6 A. It depends again on the context of
7 the application.

8 Q. And it had been applied to lots of
9 different things in the prior art in the past
10 before your patent; right?

11 MR. POPPE: Objection, Your Honor.
12 The witness is not testifying as an expert and
13 questioning about prior art is irrelevant.

14 THE COURT: I'm going to sustain
15 the objection.

16 BY MR. JOHANNINGMEIER:

17 Q. Now, did you do any searching for
18 prior art before you applied for the '556
19 patent?

20 A. Yeah, we did some searching.

21 Q. Where did you look?

22 A. There were some online sources so
23 essentially it was an online search.

24 Q. Did you disclose all of the art

1 you found to the PTO?

2 A. Yes. Well, we disclosed it to our
3 attorneys.

4 Q. Now, in that search you were
5 looking for art that was applying RAID to solid
6 state memory, right?

7 MR. POPPE: Objection, Your Honor
8 402.

9 THE COURT: I'm sorry, louder.

10 MR. POPPE: 402. Sorry, Your
11 Honor. No issue in the case.

12 MR. JOHANNINGMEIER: He testified
13 that that invention was applying RAID to solid
14 state memory.

15 THE COURT: But you're asking
16 something different here so I'm going to sustain
17 the objection.

18 MR. JOHANNINGMEIER: Thank you,
19 Your Honor.

20 BY MR. JOHANNINGMEIER:

21 Q. Now, in your direct examination
22 you put up some slides showing the XOR
23 calculations, right, simple XOR parody
24 calculation?

1 A. Yes.

2 Q. Of course you did not invent that,
3 right?

4 A. That's correct.

5 Q. That was well known?

6 A. Yes.

7 Q. Before you came up with patent?

8 A. Yes.

9 Q. Base memory addresses were well
10 known before you came up with the patent, right?

11 A. Yes, in certain applications.

12 Q. And of course we know RAID was
13 well known in general?

14 A. Correct.

15 Q. Now, dividing up memory into
16 regions and segments, that was well known in the
17 art, right?

18 A. Not so sure about that. I hadn't
19 come across too many. I'm sure there was. I
20 mean any large memory system to some extent you
21 have to subdivide it, so --

22 MR. JOHANNINGMEIER: I don't have
23 any further questions. Thank you.

24 THE COURT: All right. Thank you,

1 Mr. Johanningmeier. Any redirect?

2 MR. POPPE: Just one question,

3 Your Honor.

4 BY MR. POPPE:

5 Q. Mr. Bermingham, the Symmetix
6 systems that counsel drew your attention to in
7 the patent that pre-existed your invention and
8 use RAID, that use of RAID was in the disks not
9 in semiconductor memory; is that correct?

10 A. Yes, that's correct.

11 MR. JOHANNINGMEIER: Your Honor,
12 may I clarify one thing?

13 THE COURT: I'm going to give you
14 a chance, but it better be good.

15 BY MR. JOHANNINGMEIER:

16 Q. When you mentioned the Symmetrix
17 system had used RAID in the central memory
18 system, right, it used RAID 1 mirroring?

19 A. We used RAID 1 also known as
20 mirroring, correct.

21 MR. JOHANNINGMEIER: Thank you.

22 THE COURT: All right. Mr.
23 Bermingham, thank you very much. You may step
24 down.

1 THE WITNESS: Thank you.

2 MR. POPPE: Your Honor, our next
3 witness is Doctor Mark Jones.

4 THE COURT: All right. Can I see
5 you and whose ever from somebody from the other
6 side over at side bar for just a minute?

7 (Side bar discussion.)

8 THE COURT: All right. So what I
9 take it is your dealing with those quotes from
10 these depositions here are things that would
11 otherwise be inadmissible but they are going to
12 be admitted or they are going to be referred to
13 by the expert because it's under Rule 703
14 because it's going to help the jury evaluate,
15 the probative value is to help the jury evaluate
16 the opinions substantially outweighs any
17 prejudicial effect, but I do think putting them
18 up on the slide elevates them to a more -- you
19 know, you get more from the testimony having
20 them not appear than if they would appear. And
21 that doesn't -- and that seems to me to be
22 unnecessary. So what I'd like for you is to
23 remove, not use those slide, but you can still
24 ask them, you know, what it is people said that

1 supports his opinion, all right?

2 MR. JOHANNINGMEIER: Just to be
3 clear, the witness reading the testimony
4 verbatim into the record would have the same
5 effect, but it would have the witness
6 credibility to it.

7 THE COURT: He's either going to
8 be summarizing it -- some of that is pretty
9 bulky stuff. I don't know whether it's going to
10 be subject to summary or not, but I think he
11 could probably, I'm sure he's a smart guy, he
12 could probably summarize it, but if he needs to
13 read it, he can read it. But that's not the
14 preferable way to do it. Better to synthesize
15 it.

16 MR. POPPE: Okay. Thank you, Your
17 Honor.

18 MR. POPPE: Your Honor, may I move
19 the easel?

20 THE COURT: Sure.

21 MARK THOMAS JONES,
22 the deponent herein, having first
23 been duly sworn on oath, was
24 examined and testified as

1 follows:

2 THE COURT: So, Mr. Poppe, so I
3 have just minor point. Neither the witness nor
4 I can see the easel.

5 MR. POPPE: That's a fair point,
6 Your Honor. If I move it back into the corner
7 facing out, is that acceptable?

8 THE COURT: I'm not going to give
9 you technological instructions here, but you
10 know, the jury needs to be able to see it and
11 us.

12 MR. POPPE: Understood.

13 BY MR. POPPE:

14 Q. Good afternoon, Doctor Jones,
15 would you please state your name and introduce
16 yourself to the jury?

17 A. Yes. My name is Mark Jones and
18 I'm a professor of electrical and computer
19 engineering at Virginia Tech.

20 Q. Yeah, and if you could just make
21 sure your microphone is in a good spot so
22 everyone can hear. Thank you. What is your
23 occupation?

24 A. I'm a professor in computer

1 engineering.

2 Q. And where are you professor?

3 A. At Virginia tech. That's in
4 Blacksburg, Virginia.

5 Q. Please tell the jury why you're
6 here today?

7 A. I'm here to explain my analysis
8 and conclusions as they relate to infringement
9 of the '556 patent that we've been hearing
10 about.

11 Q. Are you being paid for your work?

12 A. Yes, I'm being paid at \$450 an
13 hour.

14 Q. Does your compensation depend in
15 any way on the testimony that you give or the
16 outcome of the case?

17 A. No, it does not.

18 Q. Please tell the jury about your
19 educational background?

20 A. I received my Bachelor of Science
21 in computer science and minor in computer
22 engineering in 1986 from Clemson University and
23 then I went on to get a PhD from Duke University
24 in computer science in 1990.

1 Q. What did you do after getting your
2 degree?

3 A. I joined the mathematics and
4 computer science division at Argon National
5 Laboratory which is part of the Department of
6 Energy and I was there for three years.

7 Q. What did you do after that?

8 A. I joined the computer science
9 faculty at the University of Tennessee at
10 Knoxville and then in 1997 I got a chance to go
11 back home to Blacksburg and I joined the faculty
12 at Virginia Tech where I've been ever since.

13 Q. During your work as a university
14 professor, what experience have you had with the
15 data storage technologies?

16 A. I've been obviously we've covered
17 that when I was an undergraduate and graduate
18 student. I've also taught it in multiple
19 classes to undergraduates and graduates,
20 graduate students. I've also been involved in
21 research that uses data storage including new
22 architectures, computer architectures that make
23 use of things like Flash memory as an integral
24 part of the architecture.

1 Q. And during your work as a
2 university professor, what experience have you
3 had with RAID technologies?

4 A. I've experienced both teaching
5 RAID to students and using it in our laboratory.

6 MR. POPPE: Your Honor, at this
7 time I would proffer Doctor Jones as an expert
8 in the fields of data storage and RAID.

9 MR. JOHANNINGMEIER: No objection.

10 THE COURT: All right. You may
11 proceed.

12 BY MR. POPPE:

13 Q. And Doctor Jones, can you give us
14 an outline of the testimony that you're prepared
15 to give today?

16 A. I've had some slides prepared that
17 summarize the testimony or at least the points
18 I'm going to hit and we'll be referring to this
19 throughout and we'll just take these one at a
20 time as they come up. The first one is just
21 briefly give you an overview of RAID technology.

22 Q. And you were in the courtroom
23 during the testimony of Mr. Bermingham; is that
24 right?

1 A. Yes, I was.

2 Q. And so I don't want you to bore
3 the jury with things that they've already heard.
4 So I'm going to skip ahead through a bit of
5 this, but can you just illustrate for the jury a
6 bit about what the name RAID actually means?

7 A. Well, it stands for as you see
8 here redundant array of independent or
9 inexpensive disks. The word array refers to the
10 fact that there are multiple disks across, they
11 are kind of arrayed together, so it's a
12 collection of disks. The word redundant refers
13 to the ability to -- having at least one extra
14 disk that will have enough information to
15 recover data, as Mr. Birmingham explained.

16 Q. And so if we go to the next slide,
17 can you explain how this illustrates the issue
18 of redundancy?

19 A. Yes, this is -- represents the
20 parody information in this case stored on a
21 single disk and this is the type of parody
22 information that Mr. Bermingham was explaining
23 in his slides.

24 Q. And you'll recall he told the jury

1 about how an exclusive-or operation works,
2 correct?

3 A. Yes.

4 Q. And did his description match your
5 understanding?

6 A. Yes, it did.

7 Q. And did his description match your
8 understanding of how parody is used to provide
9 reliability in a data storage system?

10 A. Yes, it did.

11 Q. What is the next topic that you'll
12 be covering?

13 A. This is a brief discussion of the
14 '556 Patent before we get into the actual
15 analysis of the claims for infringement
16 purposes.

17 Q. And do you have a binder in front
18 of you?

19 A. Yes, I did.

20 Q. And if you could turn to Exhibit
21 PTX- many zeros and 5.

22 A. I'm there.

23 Q. This is the '556 Patent. It's
24 already in evidence. And if you could please

1 explain for the jury what your view of the key
2 aspects of this invention are?

3 A. This is one of the two claims at
4 issue, Claim 6, and we'll just take it in three
5 parts. Part 1 as we heard Mr. Bermingham
6 explain, this is a patent that applies to
7 semiconductor memory. Semiconductor memory, as
8 an example, that would be DRAM. Another example
9 of that would be Flash memory.

10 Another part, part two highlighted
11 in yellow, that's the parity calculation that
12 Mr. Bermingham was explaining and that covers or
13 is computed with logical exclusive-or.

14 The third element below is a novel
15 architecture for an organization for the memory
16 itself that allows efficient use of
17 semiconductor memory when it's combined with
18 RAID. And we'll cover this in more detail
19 later, but I have highlighted in green some of
20 the key ideas there that it's memory segments
21 that are inside of our subdivisions of memory
22 regions which were also on memory boards. And
23 then we also highlighted the base memory address
24 aspect which gives the flexibility to realize

1 some of the advantages of semiconductor memory
2 when combined with RAID.

3 Q. So you started to touch on this.
4 Would you please explain to the jury your view
5 of the benefits that accrue from using this
6 invention in a data storage product?

7 A. Yes. Taken together the invention
8 provides reliability from the RAID capabilities,
9 it provides performance from the semiconductor
10 memory being used efficiently, as well as the
11 ability, the flexibility of the base memory
12 address allows for space efficiency and we'll
13 see that a bit more later.

14 Q. Have you looked at the issue of
15 whether EMC has used this invention in any of
16 its own products?

17 A. I analyzed the XtremIO product and
18 found it makes use of the invention.

19 Q. What's your analysis to arrive at
20 that conclusion?

21 A. I examined how the XtremIO array
22 functions based on documents both internal and
23 external hard XtremIO as well as the source code
24 that describes how XtremIO operates.

1 Q. What is the next topic that you're
2 going to cover?

3 A. This is a, just a high level
4 overview of the Pure Storage FlashArray product.
5 We have already seen a fair amount about it, but
6 I'm going to focus on one element of it.

7 Q. You stated that it's your opinion
8 that claims 6 and 7 of the '556 patent are
9 infringed by the FlashArray; is that correct?

10 A. Yes, this is the product at issue
11 and this is a product I compared to the claims
12 and ultimately reached the conclusion that it
13 infringes. And I'll be explaining that
14 conclusion later.

15 Q. This is now the Pure Storage
16 product that you're talking about?

17 A. Yes.

18 Q. Is there a particular product
19 feature that you focused on in your infringement
20 analysis regarding FlashArray?

21 A. Yes. The overall name of the
22 feature or generally referred to as the RAID-3D
23 feature by Pure Storage.

24 Q. Have you seen evidence that Pure

1 Storage regards RAID-3D as an important feature
2 of the FlashArray?

3 A. Yes, I have seen many Pure Storage
4 documents that show that and I can show you one
5 of those up here soon.

6 Q. Can you just --

7 MR. POPPE: Your Honor, I would
8 like to display PTX 141. And if we could bring
9 up the cover page, please. And if you could
10 expand the bottom section where it says
11 reliability.

12 BY MR. POPPE:

13 Q. Dr. Jones, do you recognize this
14 as a portion of Pure Storage's website?

15 A. Yes, I do.

16 Q. And do you see that in the middle
17 of this, what's been blown up which was at the
18 bottom of the first page of the exhibit, it says
19 reliability?

20 A. I do.

21 Q. And can you explain what Pure
22 Storage is referring to in this part of its
23 website?

24 A. So Pure Storage is describing

1 their RAID-3D scheme and they're indicating that
2 it provides the benefit of reliability. They're
3 also indicating that it's specifically designed
4 for solid state, they mean solid state memory,
5 the type of memory they use is Flash memory.
6 They also indicate that it's able to realize
7 minimal space overhead so space efficiency, and
8 that it can reduce average latency which would
9 be a performance benefit.

10 Q. And you mentioned solid state. Is
11 that another word for semiconductor memory?

12 A. Well, semiconductor is an example
13 of solid state. Solid state generally means no
14 moving parts in computer chips such as Flash
15 memory has no moving parts.

16 Q. There is a reference here to
17 parity. Do you see that, the fourth line down?

18 A. Yes, I do.

19 Q. And is that a reference to the
20 type of parity that we heard in the context of
21 RAID?

22 A. Yes. It makes reference to the
23 use of parity, for example, as we'll see later
24 in more detail.

1 MR. POPPE: Your Honor, I offer
2 PTX 141 into evidence.

3 MR. JOHANNINGMEIER: No objection.

4 THE COURT: Admitted without
5 objection.

6 BY MR. POPPE:

7 Q. And what is the next topic you'll
8 be testifying about?

9 A. The actual analysis we'll go
10 through that shows at a high level the analysis
11 that I did to determine whether or not the
12 FlashArray infringes claim 6 and 7 of the '556
13 patent. And I'll explain how I reached my
14 conclusions.

15 Q. Was that generally the same
16 process as what you described with respect to
17 EMC's XtremIO product?

18 A. Yes, comparing how the product
19 works to the claims of the patent.

20 Q. So we have in the corner a poster
21 board with a bunch of text we have now
22 established nobody can see, but it does, in
23 fact, show each of the elements of claim 6 and 6
24 of the '556 patent. Is that something that you

1 confirmed yourself?

2 A. Yes, I had that board prepared and
3 checked it.

4 Q. And you mentioned that you were
5 here during Mr. Bermingham's testimony. Have
6 you been here throughout the trial proceedings?

7 A. Yes, I have.

8 Q. And so did you hear at the start
9 of the trial the arguments, or I'm sorry, the
10 positions stated by Pure Storage about why they
11 claim the FlashArray does not infringe these
12 claims?

13 A. I did.

14 Q. And you heard the focus of that
15 argument was on the base memory address element
16 of the claims?

17 A. Yes.

18 Q. Do you agree with their arguments
19 about that particular element?

20 A. No, I don't. I can explain that
21 in a little more detail, but in essence I
22 analyzed it and have shown that a base memory
23 address is, in fact, assigned and I can present
24 evidence for that.

1 But essentially as I understand
2 Pure Storage's argument, they're arguing that
3 this has to be a physical address that this base
4 memory address must be that, and also that it
5 must be somehow assigned in the SSD itself, and
6 I disagree with both of those positions.

7 Q. So I'll ask you to address that in
8 more detail, but let's go through the rest of
9 the claim, and since that particular element is
10 at the bottom, we'll get to that in more detail
11 toward the end.

12 Actually, can you please bring up
13 on the screen exactly what I was going to ask
14 you for. And blow up the very top line of that.

15 Dr. Jones, do you see where it
16 says at the start of claim 6 that the invention
17 being claimed is a memory system?

18 A. Yes, I do.

19 Q. And have you looked at whether
20 FlashArray is a memory system?

21 A. Yes, I have. I have analyzed that
22 and found that it is a memory system and, in
23 fact, it's the particular memory system that's
24 claimed here, the claim elements, but it is a

1 system that stores and retrieves data and it's
2 built using as we have seen Flash memory. So I
3 found that element to be present.

4 Q. If we could please pull up PTX 12.
5 My understanding is that's in evidence. If we
6 could look at that in your binder. Do you
7 recognize this as the FlashArray users guide?

8 A. Yes.

9 Q. And if we can jump ahead to page
10 26. And then if you could expand the section
11 that begins, Flash Memory: Like disk, but
12 different.

13 Dr. Jones, can you explain to the
14 jury what you found in this exhibit that's
15 relevant to your opinion regarding FlashArray
16 being a memory system?

17 A. Yes. This is explaining that the
18 FlashArray, the Pure Storage FlashArray is built
19 to take maximum benefit from Flash storage.
20 It's built on Flash memory as opposed to, for
21 example, the spinning hard drives that we heard
22 about in the trial as well.

23 Q. And did you see this Flash memory
24 used anywhere else in the users guide of PTX 12?

1 A. I have seen it in the users guide
2 and throughout Pure Storage documents. That's
3 what people call it, it's Flash memory.

4 Q. And my plan had been to have us
5 check off one by one the elements on the board
6 over there, but since it's a bit inconveniently
7 located, maybe we'll address that later on in
8 your examination. But you do agree that the top
9 line there is met by the FlashArray system?

10 A. Yes, I do.

11 Q. Now, the claim, claim 6 uses
12 several other terms that include the word
13 memory; is that right?

14 A. Yes, they do, the memory regions,
15 memory segments and memory boards.

16 Q. And if I can have the slide show
17 back, please. I'm going to jump ahead a few
18 slides. And if you could please explain to the
19 jury the relationship between those elements
20 that you identified, the memory boards, memory
21 regions and memory segments?

22 A. Yes. This slide illustrates it
23 fairly well. We have got a memory board, an
24 example of that in the upper right-hand corner

1 of the screen you see is that green board and it
2 has some of those black rectangles on it are
3 Flash memory chips. That's according to the
4 claim are divided into memory regions, and I
5 have illustrated that here with four memory
6 regions in those big rectangles in the middle.

7 And then finally the memory
8 segment is represented by the letter S where
9 each memory region is divided into memory
10 segments.

11 Q. In the upper left of this slide
12 there is some language from claim 6 and then a
13 definition of the term memory region. That's
14 the Court's claim construction of that term; is
15 that right?

16 A. Yes, the construction is a subset
17 of memory on a memory board that can be
18 accessed, and that's the meaning that is to be
19 used for memory region in the claim.

20 Q. Is that the meaning that you have
21 used in your analysis?

22 A. Yes, I used the Court's claim
23 constructions throughout my analysis.

24 Q. In this diagram you mentioned that

1 the memory regions and segments as depicted here
2 are in the shape of a rectangle. Is there any
3 significance to that shape?

4 A. No, there is not a particular
5 shape or some particular layout, this is just a
6 convenient example.

7 Q. Do you want to take us right to
8 slide 13. And Dr. Jones, do you recognize where
9 this picture is from?

10 A. Yes. It's from a Pure Storage
11 video that is demonstrating aspects of their
12 product.

13 MR. POPPE: And I'll note it's
14 from PTX 102 and I'll move that into evidence.

15 MR. JOHANNINGMEIER: No objection.

16 THE COURT: Admitted without
17 objection.

18 BY MR. POPPE:

19 Q. And how does this relate to your
20 analysis and specifically with regard to the
21 element memory board?

22 A. This is an example of the memory
23 board that I've identified within the Pure
24 Storage system, so this is a memory board in one

1 of the SSD's that are in the Pure Storage
2 product.

3 Q. Do the FlashArray memory boards
4 have memory regions?

5 A. Yes, they do. The Pure Storage
6 organizes the memory into what's known as write
7 units which are the memory regions of the
8 claims.

9 Q. Can you explain your answer in
10 relationship to this slide, please?

11 A. Yes. In this slide I'm basing
12 this off of general documents from Pure Storage,
13 but I'm representing here that each column that
14 you see in this diagram is a solid state drive.
15 And that's a memory that has a memory board.
16 And it's the memory board of the claims. And
17 then that memory board is further divided into
18 write units. And I have highlighted write units
19 on each one of the solid state drives, but there
20 are many write units on each one of the memory
21 boards on the solid state drives.

22 Q. And what evidence have you seen
23 that those pages -- I'm sorry. Preliminary
24 question. So you mentioned that the Court has

1 defined memory region to be a subset of memory
2 on a memory board that can be accessed. What
3 evidence have you seen indicating that the
4 FlashArray memory regions are subsets of memory?
5 And you may refer to slide 16 if you would like.

6 A. Yes. Evidence that I have seen
7 includes, of course, my analysis of the source
8 code in the system, but also I have seen
9 deposition testimony from Pure Storage's
10 witnesses as well as Pure Storage documents.

11 Q. And can you summarize for the jury
12 any particular deposition testimony from Pure
13 Storage witnesses that you relied on in that
14 regard?

15 A. My recollection is testimony that
16 explains that Pure Storage has allocation, what
17 they call allocation units which is a division
18 of the memory on the boards and that those
19 allocation units are further subdivided into
20 write units and those correspond to the memory
21 on the SSD.

22 Q. Do the FlashArray memory regions
23 contain memory segments?

24 A. Yes, they do. They're further

1 divided into pages, and each -- so each write
2 unit is divided into multiple pages, and I have
3 depicted here in this diagram with the red grids
4 there that shows the write units are divided
5 into pages, and I have blown up one example of
6 the page, but every one of the write units is
7 divided into multiple pages.

8 Q. And what evidence have you seen
9 indicating that those pages are portions of
10 memory?

11 A. Again, my analysis of the source
12 code, but also deposition testimony that
13 explains this subdivision and confirms my
14 understanding.

15 Q. So now looking back, if we can go
16 back to the claim language, please, in PTX 5,
17 and looking at the next element below where it
18 says memory system, the claim requires a
19 plurality of semiconductor memory segments, the
20 segments being grouped into groups. Why do you
21 believe the FlashArray meets this claim element?

22 A. The semiconductor memory segments
23 are the pages. And those pages are grouped into
24 groups through a parity computation that takes a

1 page from each one of the --

2 Q. Let me just stop you. Let's bring
3 up a slide again, slide 21, please. Sorry, go
4 ahead with your answer.

5 A. So, Pure Storage organizes their
6 parity computation such that they across what
7 they call a write stripe, one of their
8 terminologies, takes a page from each one of the
9 write units and groups that together by
10 competing parity over it and they store that
11 parity in another one of the write units, a page
12 of the write units.

13 Q. Just to wrap that up, how does
14 that result in groups of memory segments?

15 A. Well, these are groups together
16 logically in the software, but also the
17 computation of the parities over that group of
18 pages, so the parity that's grouping them
19 together.

20 Q. Your slide highlights one group of
21 pages in that particular write stripe. Would
22 there be other groups of pages in that same
23 write stripe, in that same write stripe?

24 A. Yes, there would be many groups in

1 each of the write stripes. This is just one of
2 many of the groups and they would all have the
3 same number of pages or memory segments.

4 Q. And then you mentioned these are
5 your slides; correct?

6 A. Yes.

7 Q. But you have mentioned that you
8 based them off of Pure Storage documents?

9 A. Yes, I have examined as well as
10 the Pure Storage software, but it is a
11 representation of what I have seen in the
12 documents as well as their source code.

13 Q. And if you could take a look at
14 this, which is page 11 from the FlashArray users
15 guide, PTX 12 as well as page seven of another
16 Pure Storage document, PTX 119, are these
17 examples that you based your own diagram off of?

18 A. Yes, I think the one on the left
19 is from page 31 of the users guide.

20 Q. I misstated that.

21 MR. POPPE: Your Honor, I offer
22 PTX Exhibit 119 into evidence.

23 MR. JOHANNINGMEIER: No objection.

24 THE COURT: Admitted without

1 objection.

2 BY MR. POPPE:

3 Q. And then if we can once again pull
4 up the language of claim 6. The next part of
5 that element mentioned that each of the groups
6 includes N respective semiconductor memory
7 segments, the number N being an integer. What
8 did you conclude about whether FlashArray meets
9 that element?

10 A. I concluded that element is met
11 actually for the reasons I just explained that
12 --

13 Q. Let's pull up that slide again so
14 you can explain.

15 A. As I indicated there were multiple
16 groups there and each one of those groups would
17 have the same number of pages, the number of
18 pages in that group up there, it would be five,
19 but that number is consistent throughout that,
20 throughout the groups in the write stripe.

21 Q. And so in this instance where it
22 says there are in respective semiconductor
23 segments in a group, what would N be in this
24 example?

1 A. In my example N would be five,
2 typically much larger on the Pure Storage
3 system.

4 Q. Going back to again to the
5 language of claim 6, it next states that the N
6 respective segments in each speculative group
7 comprises, I'm going to skip the respective's,
8 data segments and a parity segment. What have
9 you concluded whether that element is met?

10 A. I concluded that is met for the
11 reasons I just explained. You saw that there
12 were data segments and then a parity segment
13 also in the group.

14 Q. And just so we're clear, let's go
15 back to the slides, please. Which of the five
16 pages indicat?

17 A. The one labeled P, that's the one
18 where parody could be computed over the four
19 pages on the left, and then the page in the
20 right hand labeled P would be the parody.

21 Q. And can you summarize for the jury
22 briefly what evidence you saw that Pure Storage
23 does use the exclusive-or calculation to
24 generate the parody?

1 A. Yes.

2 Q. MP?.

3 A. Yes, I saw that in testimony from
4 Pure Storage witnesses, but I also confirmed it
5 in the source code itself.

6 Q. And why in this slide have you not
7 included a page from the Q right unit on the,
8 the far right?

9 A. The group that's formed by
10 computing parody P is that particular group in Q
11 is not grouped with P in that computation, but
12 there's also a group that could include Q as
13 well, but for simplicity I've shown it just with
14 P.

15 Q. So am I correct that if we look at
16 the language of the Claim 6, you've now covered
17 the entirety of that larger claim element below
18 memory system?

19 A. Yes. And I believe we've covered
20 the next one as well, because that one addressed
21 the calculation using exclusive-or.

22 Q. Maybe now since we've gotten
23 through part of it, can I ask you to check off
24 the portions of the corresponding claim on the

1 board behind you?

2 The next element says that the
3 segments reside in memory regions of a memory
4 board. How does FlashArray satisfy that
5 element?

6 A. That's satisfied by the
7 explanation I gave earlier, where there's a
8 memory board that's one of the -- that's the
9 board in an SSD that's divided into the regions
10 for the right units and then the right units are
11 further divided into the pages that I just
12 described which are the segments.

13 Q. All right. And so the next claim
14 element below where you put the check marks is
15 met as well, leaving us with one to discuss?

16 A. Yes.

17 Q. And based on what you've heard so
18 far in the trial, are you aware of anything
19 being disputed by Pure Storage in what we've
20 talked about so far, any of those check marked
21 boxes or the additional one that you've just
22 discussed?

23 A. No, not based on what I've heard
24 so far at trial.

1 Q. And so if we now move to the last
2 claim element of Claim 6, again you explained
3 before your understanding that the disputed
4 point here relates to base memory address?

5 A. That's correct.

6 Q. And do you have a view on whether
7 the Pure Storage FlashArray includes base memory
8 addresses?

9 A. Yes, I do. My analysis shows that
10 it does include a base memory address that is
11 assigned to the segments in the way specified in
12 the claims.

13 Q. And let's please show Slide 26.
14 So this is the definition that you've used?

15 A. Yes, down below an address used as
16 a reference point to which a relevant address
17 may be added to determine the address of the
18 storage location to be accessed.

19 Q. And so in reference to that
20 definition, can you explain to the jury what an
21 address is?

22 A. It's at a high level an address is
23 essentially a number that a computer uses to
24 refer to something in memory, so it's trying to

1 find a location in memory and it uses that as a,
2 as the indication of what it wants to either
3 write to or read from.

4 Q. And what in the Pure Storage
5 FlashArray system in your view is a base memory
6 address? And let me show our next slide.

7 A. The base memory address in the
8 Pure Storage system that meets this limitation
9 is the page number that's assigned to a page by
10 the Pure Storage software.

11 Q. And you mentioned that the -- I'm
12 sorry, one moment. So, what in the Pure Storage
13 system is the relevant address that the Court's
14 definition of base memory address requires?

15 A. You can -- in the Pure Storage
16 software, you can add to the, to this reference
17 point or base memory address the page number,
18 and offset that would be used to locate a block
19 within that page that we've been talking about.

20 Q. So, and with respect to this
21 particular slide, can you show here where is the
22 base memory address and what is the -- how does
23 the offset work to identify a storage location?

24 A. So this is just an example I

1 prepared to explain kind of a little bit of the
2 concept of base memory address. And for this, a
3 base memory address is referring to the, in this
4 case the upper left part of the memory segment
5 or the really the beginning of the memory
6 segment and the offset in this case, 13, is just
7 how far to move into that memory segment, in
8 this case, to find the data that you're looking
9 for, and in this case just that white square
10 there.

11 Q. And so in the Pure Storage system,
12 you mentioned a page number as the base memory
13 address; is that right?

14 A. Yes, a page number that would be
15 the base memory address of a particular page.

16 Q. And then what is the offset --
17 first of all, why is an offset needed in the
18 Pure Storage system?

19 A. In the Pure Storage system they
20 are trying to, as we saw earlier, in multiple
21 ways trying to reduce the amount of data that's
22 actually -- space that's taken up actually on
23 the Flash memory, so they pack in information,
24 and these C Blocks are examples of information

1 that's packed into each page and then ultimately
2 you want to retrieve that information and you
3 want to find that particular C Block, so you
4 need to move into the middle of the page like C
5 Block 2 there, you would need to have an offset
6 to locate C Block 2.

7 Q. So C Block, that's a term that
8 Pure Storage uses internally to describe these
9 blocks of data?

10 A. Yes.

11 Q. And so if we wanted to use the
12 Pure Storage system to get at that second C
13 Block, can you explain how that would involve
14 the use of a base memory address?

15 A. Yes, Pure Storage, when I want to
16 find one of these C Blocks, not only stores the
17 page number where it's located, but in addition
18 they also store and basically the offset within
19 that page where that C Block starts.

20 Q. All right. Now, you summarized
21 earlier the reasons why you understand Pure
22 Storage disagrees that they have a base memory
23 address. And again, here we show the claim
24 language and we show the claim construction.

1 What is your understanding of -- you also
2 explained specifically that they disagree with
3 whether the page number that you were referring
4 to is an address. And can you explain why you
5 believe it is?

6 A. It's what's being used to locate
7 the information that's being retrieved and to
8 refer to it, so it's being used like an address
9 and my examination of the source code of Pure
10 Storage indicates that they believe it's an
11 address as well, at least within the design of
12 the source code.

13 Q. And in your reading of the claim
14 and in particular of the Court's claim
15 construction, do you understand there to be any
16 limitations on the type of address that it can
17 be?

18 A. There's no limitation that it
19 would have to be for example a physical address.
20 That language doesn't appear in the claim or the
21 claim construction. It has to meet the claim
22 limitation and the Court's construction, but as
23 I explained, it meets that.

24 Q. And what is your view as to

1 whether a person of ordinary skill in the art
2 reading a reference to an address would
3 understand that to exclude physical address?

4 A. Well, we've already heard about
5 different types of addresses in the testimony
6 thus far, but from the point of view of one of
7 ordinary skill in the art, a computer address
8 isn't restricted to either a physical or a
9 logical address, they are both types of
10 addresses.

11 Q. The claim -- this portion of the
12 claim also mentions that a base memory address
13 may be assigned. Do you see that in the fourt
14 row of this part of the claim?

15 A. Yes, I do.

16 Q. What is it in FlashArray that
17 identifies the page number that you've
18 identified in the base memory address?

19 A. It's the software, the Purity
20 software that's running that assigns the page
21 number to the pages.

22 Q. And is there anything in the
23 claim, based on your analysis, that restricts
24 that act of assigning to any particular portion

1 of the product?

2 A. No, no there's not.

3 Q. Have you seen any evidence
4 indicating -- any evidence from Pure Storage
5 indicating that the page number indicates a
6 particular physical location on the memory?

7 A. Yes, I've seen testimony from Pure
8 Storage witnesses that explains how the process
9 works and how it's used to locate the
10 information as it's stored on the SSD's.

11 Q. All right. And if we can bring
12 the full Claim 6 up again. Just to wrap up on
13 your discussion of Claim 6, the second part of
14 that element mentions that the base memory
15 address that's assigned to a memory segment is
16 different from other respective base memory
17 addresses assigned to other segments in the same
18 memory region and is that claim element met by
19 FlashArray?

20 A. Yes, it is. They assign the base
21 memory addresses to the pages in a way that
22 varies across the pages that it is, it's not
23 just unique, it's -- there's no way to view them
24 as the same base memory address for each one of

1 the pages that are -- page numbers that are
2 assigned.

3 Q. And then so in summary, having
4 gone through each of the elements, do you have
5 an opinion as to whether Claim 6 is infringed by
6 the Pure Storage FlashArray?

7 A. Yes, it's my opinion that Pure
8 Storage's FlashArray product infringes Claim 6
9 of the '556 Patent because it meets each and
10 every element as my analysis shows.

11 Q. Claim 7 adds just one additional
12 element; is that correct?

13 A. Yes, Claim 7 is a dependent claim
14 and so it includes all of the limitations of
15 Claim 6 that's indicated by the language that
16 says the memory system of Claim 6, plus it has
17 an additional element that has to be met.

18 Q. And the additional element
19 essentially is that each of the memory segments
20 in a group must be on a different memory board;
21 is that right?

22 A. Yeah, the memory segments are
23 distributed among electrical circuit boards and
24 then there's language such that none of the

1 circuit boards includes more than one respective
2 segment from each respective group. So every
3 memory or every electrical circuit board or
4 memory board has to have exactly or at most one
5 segment.

6 Q. And are you aware -- and
7 FlashArray does that?

8 A. My analysis shows that that's the
9 way the FlashArray system works and that is part
10 of the design to make the parody effective so
11 that if you lost one of the boards you would
12 still be able to recover the information on it
13 using the exclusive-or.

14 Q. Are you aware of any dispute over
15 whether that part of Claim 7 is met by the
16 FlashArray?

17 A. No, I didn't hear anything dispute
18 go that.

19 Q. During your testimony you referred
20 to a couple of instances where certain claim
21 language had been interpreted by the Court and
22 you followed that interpretation in your
23 analysis. Did you do that with all of the claim
24 interpretations that were provided by the Court

1 for these claims of the '556 Patent?

2 A. Yes, I did.

3 THE COURT: Mr. Poppe, would this
4 be a good time to end for the day?

5 MR. POPPE: Sure. That would be
6 fine.

7 THE COURT: Okay. All right.
8 Members of the jury, we are going to end for the
9 day, so basically three things; one, we'll start
10 again tomorrow at 9:30, so you were good, you
11 were all here, try to be here so we can start at
12 9:30. I'll meet with the lawyers and try to
13 make sure we're all ready so we don't waste a
14 lot of time.

15 Second thing is I want to repeat
16 my instruction about not discussing this case
17 with each other or with anybody else, family,
18 your friends. Don't post things electronically
19 about it. Keep your thoughts to yourself and
20 keep your mind open so that when you do discuss
21 the case a week from now, you know, you don't
22 unfairly concentrate on one piece of -- you
23 know, you don't make up your mind until you
24 actually discuss it with or colleagues here.

1 The third thing is, don't do any
2 research, don't go on Google or anything to try
3 to find out things that you'd like to know a
4 little bit more about than you've heard so far.
5 Everything that you're going to learn about this
6 case, you need to learn about it in the
7 courtroom, so don't do any independent research
8 of any kind.

9 All right. Can we take the jury
10 out and have a nice evening.

11 So Mr. Poppe, I'm sorry, I
12 tried -- I'm trying to, you know, break at a
13 time where it seemed appropriate. I knew you
14 weren't going to be able to finish what you had
15 to do in the next 30 seconds, so if I didn't
16 quite catch the moment right, I'm sorry about
17 that. All right, is there anything else anybody
18 wants to discuss?

19 MR. KREVITT: Nothing from the
20 Plaintiff, Your Honor. Thank you.

21 MR. VAN NEST: Your Honor, I'd
22 just like to get a sense of when Plaintiff's
23 case, and I use the word rest in quotes because
24 I understand I'm keeping it open for them to

1 examine.

2 THE COURT: Actually that's a very
3 reasonable question. So first off, after we
4 finish with Mr. -- Doctor Jones -- no, no, I
5 remember the last name. I try to get the titles
6 right here.

7 MR. KREVITT: Doctor Jones.

8 THE COURT: Doctor Jones,
9 professor, what more do you have on -- you have
10 your damages person for sure.

11 MR. KREVITT: Here's what we have,
12 Your Honor. We have the videotape and then we
13 have two more witnesses, Josh Goldstein whom you
14 met the first day, and our damages expert, Brian
15 Napper. And then we're done in the way Mr. Van
16 Nest means. We're not going to rest.

17 THE COURT: Right. And you said
18 tape, is that still thirty minutes of tape?

19 MR. KREVITT: I don't have an
20 exact number. I think we're in that range.
21 We're certainly sub one hour and I think we're
22 in the thirty to forty-five minutes range.

23 THE COURT: So it sounds to me
24 like you probably are not going to finish before

1 lunchtime tomorrow?

2 MR. KREVITT: No, I wouldn't think
3 so, Your Honor, based on -- I don't know how
4 long, any sense how long the cross-examination
5 will be of Dr. Jones?

6 MR. JOHANNINGMEIER: Probably not
7 too lengthy. Probably short.

8 MR. KREVITT: Assuming it's not
9 too lengthy, around lunchtime or shortly into
10 the mid afternoon.

11 MR. VAN NEST: That gives me a
12 good sense, Your Honor. Thank you.

13 THE COURT: Okay. All right. So
14 there is nothing else, we'll be in recess and
15 we'll see you tomorrow morning at nine o'clock.

16 (Court recessed at 5:03 p.m.)
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1 State of Delaware)
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7 I, Dale C. Hawkins, Registered Merit
8 Reporter, Certified Shorthand Reporter, and Notary
9 Public, do hereby certify that the foregoing record,
10 Pages 348 to 692 inclusive, is a true and accurate
11 transcript of my stenographic notes taken on March 8,
12 2016, in the above-captioned matter.
13

14 IN WITNESS WHEREOF, I have hereunto set my
15 hand and seal this 8th day of March 2016, at
16 Wilmington.
17

18
19 /s/ Dale C. Hawkins

20 Dale C. Hawkins, RMR
21
22
23
24

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|---|---|---|---|---|
| <p>\$15,000 [1] - 440:20 \$25 [1] - 403:18 \$450 [1] - 653:12 \$475 [1] - 441:17 '015 [48] - 356:2, 384:22, 385:8, 392:17, 404:10, 408:17, 409:6, 410:20, 419:20, 420:5, 444:12, 454:15, 455:4, 455:8, 461:8, 462:17, 470:8, 470:15, 471:23, 476:5, 480:5, 480:13, 499:13, 534:9, 534:13, 534:17, 534:21, 535:4, 535:6, 535:23, 536:14, 538:2, 538:5, 538:9, 538:21, 538:22, 542:2, 551:2, 551:9, 551:12, 551:21, 552:11, 552:13, 556:12, 570:12, 589:13, 592:3, 592:7 '02 [1] - 456:3 '09 [2] - 448:5, 457:11 '464 [51] - 350:15, 356:2, 360:20, 384:15, 384:17, 392:17, 404:10, 409:7, 410:20, 419:20, 420:5, 444:11, 448:18, 449:1, 476:5, 480:5, 480:19, 480:22, 481:3, 481:5, 481:7, 482:2, 499:18, 503:14, 509:24, 530:1, 533:13, 533:15, 534:9, 534:13, 534:15, 538:2, 540:3, 540:8, 540:12, 541:1, 542:4, 542:7, 551:3, 551:9, 551:13, 551:21, 552:17, 556:12, 569:9, 570:15, 570:19, 571:2, 589:12, 592:4, 592:7 '556 [24] - 531:23, 532:5, 609:8, 609:17, 610:17, 611:6, 613:16, 617:11, 637:5, 637:8, 637:22, 639:8, 639:19,</p> | <p>639:23, 644:3, 646:18, 653:9, 657:14, 657:23, 660:8, 663:12, 663:24, 686:9, 688:1 '70s [1] - 405:7 '80s [2] - 638:14, 638:18 '93 [1] - 612:11 /s [1] - 692:19 0 [6] - 404:23, 620:20, 620:22, 621:3 0.1 [7] - 427:12, 456:5, 458:23, 459:7, 459:13, 459:24 0.11 [1] - 458:22 0005 [2] - 609:12, 609:20 1 [19] - 370:12, 410:13, 428:5, 429:12, 535:5, 535:22, 536:13, 552:12, 596:24, 620:19, 620:22, 620:23, 621:3, 640:9, 649:18, 649:19, 658:5 1,600 [4] - 558:16, 558:17, 559:4, 600:19 1.1 [1] - 402:23 1.4 [1] - 599:6 1.5 [1] - 403:3 1.6 [1] - 599:6 1.8 [1] - 403:3 10 [16] - 422:3, 424:13, 468:1, 483:22, 595:23, 596:15, 596:16, 596:23, 596:24, 598:4, 598:8, 598:12, 598:15, 598:19, 599:11 102 [1] - 669:14 11 [4] - 396:17, 423:9, 424:13, 674:14 119 [4] - 463:18, 463:19, 674:16, 674:22 11:14 [1] - 438:14 11th [1] - 386:22 12 [7] - 506:1, 506:8, 531:5, 616:23, 666:4, 666:24, 674:15 127 [3] - 360:12, 402:4, 402:17 12:48 [1] - 531:8 12th [1] - 386:21 13 [6] - 411:18</p> | <p>421:17, 421:19, 455:14, 669:8, 681:6 13-1985-RGA [1] - 348:6 13th [2] - 466:10, 466:14 14 [4] - 373:14, 374:10, 429:24, 459:16 141 [2] - 661:8, 663:2 15 [6] - 432:19, 433:6, 552:12, 626:23, 627:1, 631:15 16 [15] - 427:5, 427:10, 427:15, 427:21, 428:16, 428:21, 429:2, 457:6, 468:1, 476:4, 552:12, 616:22, 616:23, 636:5, 671:5 16th [1] - 472:1 17 [5] - 463:18, 463:20, 616:23, 627:21, 627:22 18 [1] - 570:1 180 [2] - 579:8, 579:15 181 [2] - 579:6, 579:7 193 [1] - 459:15 1968 [1] - 482:12 1971 [1] - 482:12 1981 [2] - 390:17, 390:24 1986 [3] - 383:7, 392:1, 653:22 1990 [1] - 653:24 1990's [1] - 613:2 1993 [3] - 612:8, 641:4, 641:9 1997 [1] - 654:10 1:53 [1] - 532:24 2 [5] - 348:4, 370:12, 552:12, 682:5, 682:6 20 [9] - 392:23, 401:24, 408:24, 410:8, 410:12, 422:21, 423:24, 454:22, 636:5 200 [1] - 400:24 2000 [1] - 397:19 2000's [4] - 613:2, 615:15, 616:6, 619:1 2001 [8] - 385:22, 386:3, 386:21, 393:16, 394:2, 394:8, 399:11, 639:24 2002 [23] - 404:21, 404:23, 411:18, 411:23, 421:11, 421:12, 422:20</p> | <p>422:21, 423:24, 427:5, 427:6, 427:10, 427:14, 431:14, 431:15, 450:23, 451:7, 454:16, 455:14, 455:23, 466:6, 469:10, 476:4 2003 [3] - 357:21, 551:18, 551:23 2004 [5] - 400:13, 400:14, 439:18, 551:18, 551:24 2005 [1] - 616:7 2006 [3] - 400:8, 402:9, 439:20 2007 [2] - 402:16, 432:7 2008 [3] - 367:22, 368:2, 371:1 2009 [3] - 402:18, 440:24, 445:1 2010 [1] - 402:23 2011 [1] - 616:13 2012 [3] - 370:21, 371:14, 393:10 2013 [9] - 370:15, 371:5, 372:1, 372:24, 376:11, 377:21, 378:9, 379:12, 381:12 2014 [2] - 381:14 2015 [2] - 440:22, 440:24 2016 [3] - 348:10, 692:12, 692:15 20th [3] - 422:20, 454:16, 470:6 21 [2] - 603:1, 673:3 22 [2] - 612:9, 612:12 23 [5] - 596:2, 596:17, 597:20, 597:21, 599:3 23rd [1] - 415:20 24 [3] - 463:18, 463:20, 639:10 25 [10] - 403:17, 411:23, 562:18, 563:7, 595:8, 600:18, 601:7, 601:10, 627:8, 627:13 25.1 [2] - 562:15, 562:22 250 [3] - 402:6, 402:7, 402:18 26 [3] - 352:1, 666:10, 679:13 27 [2] - 402:1, 421:14 271 [1] - 467:23,</p> | <p>467:24 27th [3] - 421:11, 421:23, 466:13 28 [2] - 627:8, 627:13 29 [4] - 372:24, 376:11, 377:21, 639:11 2:00 [1] - 531:5 3 [3] - 384:21, 427:6, 454:20 3.0 [1] - 373:1 30 [8] - 372:1, 408:24, 410:9, 484:21, 485:3, 561:14, 689:15 30(b)(6)'s [2] - 632:13, 634:19 30-megabyte [1] - 484:22 30/30 [1] - 485:3 30/30. [1] - 485:5 31 [4] - 545:20, 545:22, 636:6, 674:19 32 [23] - 361:1, 378:13, 481:11, 509:23, 512:5, 512:13, 513:9, 513:12, 529:13, 530:1, 533:14, 540:9, 552:16, 569:9, 570:1, 570:19, 570:22, 589:1, 597:1, 606:2, 606:4, 606:14, 636:5 33 [2] - 546:16, 636:6 3340 [2] - 484:14, 484:16 34 [2] - 597:14, 636:6 348 [1] - 692:10 38 [1] - 546:16 3rd [5] - 427:14, 427:22, 455:23, 456:3, 457:22 3th [1] - 421:12 4 [1] - 640:12 40 [4] - 400:23, 401:11, 483:1, 488:18 402 [2] - 647:8, 647:10 44 [2] - 601:24, 602:10 46 [1] - 402:2 47 [3] - 553:4, 553:7, 553:13 49 [3] - 430:16, 430:19, 431:1 5 [7] - 626:24, 639:8, 640:13, 640:14, 657:21, 672:16 50 [2] - 430:16, 431:1</p> |
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500 [2] - 400:24,
402:13
51 [1] - 431:1
512 [2] - 539:5, 548:18
523 [1] - 641:6
528 [1] - 638:24
55 [1] - 431:1
57 [1] - 431:1
570 [2] - 402:6, 402:18
59 [1] - 431:3
5:03 [1] - 691:16
6 [22] - 595:15, 595:16,
626:24, 627:9,
658:4, 660:8,
663:12, 663:23,
665:16, 667:11,
668:12, 675:4,
676:5, 677:16,
679:2, 685:12,
685:13, 686:5,
686:8, 686:15,
686:16
6.57 [1] - 595:17
6.58 [1] - 559:17
60 [4] - 404:2, 404:3,
404:4, 484:21
600,000 [1] - 398:2
62 [1] - 431:3
63 [1] - 431:5
65 [3] - 431:5, 553:24,
554:5
66 [1] - 431:5
67 [1] - 431:5
68 [1] - 431:6
692 [1] - 692:10
6A [1] - 348:11
7 [10] - 459:15, 459:16,
471:23, 552:12,
595:16, 660:8,
663:12, 686:11,
686:13, 687:15
70's [1] - 448:14
701 [1] - 380:21
702 [2] - 544:17, 546:9
703 [1] - 650:13
75 [3] - 403:7, 403:18,
403:19
797 [1] - 454:19
8 [8] - 348:10, 400:22,
401:3, 401:20,
424:21, 455:21,
598:7, 692:11
80 [1] - 403:8
807 [3] - 376:5, 376:7,
377:2
810 [2] - 371:21, 372:4
844 [1] - 348:12
8th [1] - 692:15
9 [2] - 418:12, 424:13
905 [2] - 584:2

95 [4] - 548:18,
548:19, 549:1,
549:10
99 [2] - 558:20, 566:5
9:00 [1] - 348:10
9:30 [2] - 688:10,
688:12
9th [1] - 639:24
a.m [2] - 348:10,
438:14
A9 [2] - 494:17, 495:1
abbreviated [1] -
620:18
ability [3] - 594:20,
656:13, 659:11
able [27] - 353:1,
357:2, 389:7,
395:21, 397:3,
399:2, 399:21,
400:5, 400:7,
425:20, 427:19,
443:21, 444:7,
449:6, 452:11,
457:6, 465:22,
498:16, 561:16,
561:18, 563:9,
563:10, 626:19,
652:10, 662:6,
687:12, 689:14
above-captioned [1] -
692:12
absence [1] - 556:21
absent [1] - 557:2
absolute [1] - 598:14
absolutely [8] -
412:24, 428:19,
476:10, 518:10,
531:2, 598:10,
598:13, 601:16
abstract [4] - 436:4,
453:5, 453:11,
634:11
academics [1] -
476:18
Academy [2] - 390:14,
393:10
accent [1] - 482:10
accept [2] - 488:20,
508:3
acceptable [24] -
534:7, 539:19,
541:1, 542:6, 543:4,
543:8, 543:14,
543:24, 544:11,
544:22, 545:9,
545:16, 545:18,
547:7, 547:23,
556:19, 559:2,
563:9, 563:23,
593:17, 595:5

595:9, 602:18, 652:7
access [6] - 418:20,
419:5, 456:24,
558:13, 629:24,
630:8
accessed [3] - 668:18,
671:2, 679:18
accesses [4] - 626:10,
629:1, 629:3, 645:2
acclaimed [1] - 476:21
accommodate [1] -
562:24
accomplish [2] -
405:24, 406:16
according [3] -
506:22, 593:20,
668:3
account [2] - 561:23,
571:8
accounts [2] - 374:10,
374:12
accrue [1] - 659:5
accurate [1] - 692:10
accurately [2] -
523:24, 524:3
accused [4] - 504:18,
528:14, 530:8, 587:4
accusing [1] - 593:6
achieve [8] - 405:19,
407:2, 408:22,
409:17, 419:6,
528:18, 619:8,
626:20
achieved [1] - 410:8
achieving [2] - 628:3,
628:15
acknowledge [1] -
501:14
ACM [1] - 393:12
acquired [13] - 368:7,
371:13, 402:19,
439:16, 440:5,
440:13, 445:1,
446:10, 616:17,
642:14, 642:17,
642:18, 642:22
acquiring [1] - 446:4
acquisition [3] -
357:22, 402:22,
440:10
acronym [1] - 612:19
act [1] - 684:24
acting [1] - 447:7
active [1] - 486:24
activity [1] - 626:8
acts [1] - 530:3
actual [11] - 419:18,
487:6, 514:12,
518:15, 527:15,
528:2, 594:12

581:22, 603:18,
657:14, 663:9
ADAM [1] - 349:13
add [4] - 368:5,
559:12, 560:13,
680:16
added [2] - 622:13,
679:17
adding [5] - 512:11,
559:21, 615:9,
615:10, 615:11
addition [10] - 409:24,
441:3, 454:1,
487:10, 545:19,
546:22, 554:11,
605:15, 632:18,
682:17
additional [9] -
559:22, 615:10,
620:2, 620:18,
622:14, 678:21,
686:11, 686:17,
686:18
address [47] - 352:13,
527:13, 628:14,
628:24, 629:16,
630:5, 645:24,
658:23, 659:12,
664:15, 664:23,
665:3, 665:4, 665:7,
667:7, 679:4,
679:10, 679:15,
679:16, 679:17,
679:21, 679:22,
680:6, 680:7,
680:13, 680:14,
680:17, 680:22,
681:2, 681:3,
681:13, 681:15,
682:14, 682:23,
683:4, 683:8,
683:11, 683:16,
683:19, 684:2,
684:3, 684:7, 684:9,
684:12, 684:18,
685:15, 685:24
addressed [1] -
677:20
addresses [14] -
610:22, 629:15,
630:3, 630:17,
644:17, 645:6,
645:10, 645:14,
648:9, 679:8, 684:5,
684:10, 685:17,
685:21
addressing [2] -
502:4, 641:20
adds [2] - 618:20,
686:11

admission [1] - 546:7
admitted [18] - 377:4,
384:1, 385:1,
424:16, 430:10,
431:21, 432:1,
450:18, 506:11,
546:11, 546:19,
553:16, 554:8,
609:21, 650:12,
663:4, 669:16,
674:24
Admitted [1] - 372:6
advantage [3] -
373:15, 498:1, 498:2
advantages [8] -
374:9, 497:15,
497:19, 498:21,
543:10, 543:11,
638:10, 659:1
advisor [1] - 394:4
advisory [4] - 441:4,
444:22, 445:6,
446:20
AFA [2] - 377:10,
377:17
affect [1] - 502:8
affectionately [1] -
485:2
afford [1] - 563:10
affordable [1] - 492:15
afternoon [10] -
531:20, 565:1,
565:2, 608:6,
608:22, 608:23,
636:21, 636:23,
652:14, 691:10
agencies [4] - 565:15,
565:16, 566:2,
567:23
agency [4] - 565:12,
565:23, 567:20,
567:21
ago [33] - 385:15,
456:12, 457:15,
460:5, 460:7,
460:18, 461:7,
461:13, 461:21,
461:22, 461:23,
461:24, 462:4,
462:8, 463:11,
464:11, 464:13,
465:23, 466:2,
467:11, 467:18,
469:2, 469:3, 470:1,
470:7, 470:14,
471:8, 471:22,
472:9, 483:1,
525:23, 583:12,
612:9
agree [19] - 412:3,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

480:9, 503:21,
503:24, 520:11,
528:5, 534:21,
559:24, 570:20,
577:12, 578:7,
581:9, 581:11,
582:3, 582:4,
591:12, 593:16,
664:18, 667:8
agreed [3] - 477:24,
510:7, 581:20
agreeing [1] - 635:4
agreement [2] -
480:15, 581:4
agrees [5] - 510:4,
512:9, 515:20,
521:5, 522:4
ahead [10] - 352:8,
445:16, 452:1,
458:11, 508:22,
533:7, 656:4, 666:9,
667:17, 673:4
aimed [1] - 379:16
alert [1] - 631:14
algorithm [1] - 408:19
All-Flash [3] - 368:10,
368:13, 444:8
all-Flash [4] - 377:14,
377:17, 591:1, 592:3
All-FlashArray [2] -
371:19, 376:8
allocation [3] -
671:16, 671:17,
671:19
allow [6] - 350:23,
437:7, 466:23,
468:12, 539:23,
630:1
allowed [4] - 351:16,
383:15, 451:18,
467:15
allows [4] - 391:17,
630:12, 658:16,
659:12
almost [4] - 483:1,
488:18, 532:6,
616:23
alone [1] - 567:10
alternative [13] -
534:3, 539:10,
541:1, 543:5,
543:14, 545:9,
545:16, 563:24,
564:8, 593:10,
593:14, 593:20,
601:6
alternatives [10] -
530:22, 533:18,
533:19, 534:8,
535:1, 537:17,

537:18, 540:2,
542:7, 563:15
altogether [1] - 404:20
Amdel [5] - 486:12,
486:17, 486:23,
486:24, 487:5
America [1] - 398:2
amount [14] - 493:14,
498:15, 557:5,
559:11, 561:5,
561:7, 561:17,
562:4, 601:3,
618:17, 633:14,
635:12, 660:5,
681:21
amounts [2] - 489:17,
490:24
analogy [1] - 390:10
analysis [26] - 358:12,
361:8, 423:15,
507:24, 560:14,
579:22, 581:20,
592:15, 593:21,
626:11, 653:7,
657:15, 659:19,
660:20, 663:9,
663:10, 668:21,
668:23, 669:20,
671:7, 672:11,
679:9, 684:23,
686:10, 687:8,
687:23
analyze [3] - 591:23,
595:13, 600:21
analyzed [7] - 471:8,
560:6, 591:15,
592:7, 659:17,
664:22, 665:21
ANDREWS [1] -
348:14
Andy [1] - 376:18
Aneel [1] - 447:7
animation [8] - 494:8,
495:6, 513:18,
517:13, 523:17,
523:20, 523:24,
525:1
announced [1] - 373:1
annual [1] - 449:21
answer [21] - 352:15,
355:22, 415:1,
415:4, 417:3,
449:23, 451:18,
451:21, 459:16,
460:2, 461:11,
463:23, 464:4,
468:3, 468:6, 468:7,
470:13, 471:2,
594:1, 670:9, 673:4
Answer [2] - 459:23.

464:2
answering [2] - 474:3,
474:4
anticipate [2] -
353:17, 363:23
anticipated [1] -
389:21
anticipation [4] -
434:6, 436:9,
437:19, 438:5
anyhow [1] - 416:1
anyway [1] - 574:16
apart [5] - 362:3,
485:18, 486:8,
505:16, 588:22
apologize [3] -
353:18, 353:19,
624:14
appear [4] - 641:7,
650:20, 683:20
APPEARANCES [2] -
348:17, 349:1
appeared [1] - 471:9
appliances [2] -
566:8, 566:13
applicability [1] -
646:1
application [3] -
369:5, 627:19, 646:7
applications [3] -
612:20, 645:14,
648:11
applied [9] - 390:16,
407:22, 622:20,
625:3, 631:8,
639:18, 646:4,
646:8, 646:18
applies [1] - 658:6
apply [4] - 410:2,
509:11, 509:17,
621:14
applying [4] - 622:24,
623:5, 647:5, 647:13
appreciate [3] -
366:21, 366:22,
478:9
approach [10] -
382:17, 410:4,
438:21, 452:16,
479:10, 479:12,
608:18, 622:24,
636:1, 636:18
approached [1] -
446:21
approaches [2] -
449:5, 502:1
appropriate [2] -
415:15, 689:13
approved [1] - 636:10
approval [1] - 427:6,
428:1, 428:7,

427:14, 427:22,
440:21, 444:23,
455:23, 456:3,
457:22
architect [1] - 554:14
architectural [19] -
425:2, 425:4, 425:8,
425:12, 425:17,
426:1, 426:14,
427:5, 429:3, 430:7,
431:10, 455:20,
455:22, 460:8,
462:11, 462:17,
553:21, 554:2, 590:4
architecture [7] -
422:9, 425:5, 487:8,
553:2, 553:8,
654:24, 658:15
architectures [3] -
614:8, 654:22
archival [2] - 442:18,
452:16
archive [1] - 424:9
archiver [1] - 442:18
area [3] - 376:1,
615:24, 618:7
areas [3] - 375:24,
614:9, 629:2
arena [1] - 489:16
Argon [1] - 654:4
arguing [1] - 665:2
argument [4] - 352:23,
354:17, 664:15,
665:2
argumentative [1] -
582:24
arguments [2] - 664:9,
664:18
arranged [1] - 538:2
array [9] - 367:24,
368:1, 368:2,
377:18, 527:14,
602:9, 656:8, 656:9,
659:21
arrayed [1] - 656:11
Arrays [2] - 641:2,
641:9
arrays [3] - 559:4,
597:21, 598:6
arrive [1] - 659:19
arrived [2] - 487:5,
497:7
arrow [4] - 573:23,
573:24, 574:8,
574:21
arrows [2] - 521:24,
575:5
ARSHT [1] - 348:19
art [18] - 433:22,
434:1, 435:7,

437:24, 438:2,
465:2, 640:19,
641:17, 642:2,
642:9, 646:9,
646:13, 646:18,
646:24, 647:5,
648:17, 684:1, 684:7
article [3] - 398:1,
437:10, 639:2
articles [1] - 638:22
ASIC [2] - 612:16,
612:18
aside [1] - 413:4
aspect [2] - 405:16,
658:24
aspects [4] - 560:20,
615:21, 658:2,
669:11
asserted [5] - 481:7,
534:8, 554:19,
555:1, 605:16
asserting [2] - 570:22,
627:10
assign [3] - 515:11,
539:2, 685:20
assigned [13] - 515:4,
515:23, 571:17,
619:1, 628:9,
664:23, 665:5,
679:11, 680:9,
684:13, 685:15,
685:17, 686:2
assignee [2] - 385:17,
500:5
assigning [2] -
535:24, 684:24
assignments [2] -
565:8, 565:17
assigns [4] - 514:22,
515:17, 515:20,
684:20
assistance [1] - 371:8
associated [8] -
398:8, 416:16,
498:11, 501:3,
507:6, 536:7, 539:9,
610:21
assume [4] - 359:12,
457:13, 531:20,
600:17
assuming [2] - 459:7,
691:8
assumption [2] -
459:9, 470:2
assurance [1] -
487:23
assure [1] - 415:8
atmosphere [1] -
617:5
attempt [1] - 453:18

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|---|--|---|--|--|
| <p>attempted [1] - 448:20</p> <p>attempts [2] - 501:21, 501:23</p> <p>attend [2] - 449:14, 568:14</p> <p>attended [6] - 434:18, 450:1, 451:9, 452:4, 482:11, 568:8</p> <p>attending [1] - 451:11</p> <p>attention [3] - 365:9, 627:7, 649:6</p> <p>attenuated [1] - 357:6</p> <p>attorneys [1] - 647:3</p> <p>attributable [3] - 356:14, 357:8, 404:6</p> <p>August [1] - 639:24</p> <p>authentic [1] - 435:15</p> <p>authenticity [3] - 435:11, 435:21, 437:23</p> <p>author [1] - 641:1</p> <p>authors [1] - 376:17</p> <p>auto [1] - 409:15</p> <p>availability [3] - 374:5, 435:12, 437:22</p> <p>available [7] - 373:7, 534:7, 589:18, 589:19, 589:20, 590:14, 614:20</p> <p>Avamar [2] - 642:23, 642:24</p> <p>average [15] - 560:7, 561:14, 562:22, 595:12, 595:23, 596:23, 598:8, 598:23, 600:6, 601:3, 601:9, 601:12, 603:2, 603:5, 662:8</p> <p>averaged [1] - 562:8</p> <p>averages [1] - 560:15</p> <p>avoid [7] - 388:23, 395:5, 537:22, 538:8, 540:7, 542:2, 542:14</p> <p>awarded [1] - 384:10</p> <p>awards [3] - 393:1, 393:3, 393:6</p> <p>aware [14] - 363:1, 437:24, 444:6, 444:9, 445:5, 445:20, 445:21, 446:5, 446:19, 448:4, 460:15, 678:18, 687:6, 687:14</p> <p>awfully [1] - 532:15</p> <p>B-E-R-M-I-N-G-H-A-M [1] - 608:11</p> <p>Babson [1] - 612:2</p> | <p>Bachelor [2] - 482:22, 653:20</p> <p>bachelors [1] - 483:4</p> <p>background [36] - 476:14, 482:7, 482:8, 489:4, 489:5, 493:19, 493:22, 493:23, 494:6, 494:19, 494:22, 495:3, 495:7, 495:9, 495:24, 497:12, 497:16, 497:24, 498:12, 498:14, 498:22, 504:4, 543:11, 543:23, 547:19, 548:21, 549:4, 592:24, 593:4, 593:7, 593:9, 611:8, 639:9, 639:14, 639:20, 653:19</p> <p>backing [1] - 513:19</p> <p>backup [10] - 387:5, 396:7, 398:3, 398:9, 405:21, 442:11, 442:13, 442:16, 443:1, 591:5</p> <p>balance [3] - 615:6, 617:7, 626:4</p> <p>ballpark [2] - 364:4, 392:22</p> <p>Bank [1] - 398:1</p> <p>banks [1] - 613:8</p> <p>bar [5] - 397:9, 412:7, 412:8, 650:6, 650:7</p> <p>base [44] - 369:3, 369:5, 369:18, 370:2, 370:11, 511:8, 628:9, 628:14, 628:23, 629:14, 629:16, 630:3, 630:5, 644:17, 645:6, 645:9, 645:14, 645:24, 648:9, 658:23, 659:11, 664:15, 664:22, 665:3, 679:4, 679:7, 679:10, 680:5, 680:7, 680:14, 680:17, 680:22, 681:2, 681:3, 681:12, 681:15, 682:14, 682:22, 684:12, 684:18, 685:14, 685:16, 685:20, 685:24</p> <p>based [29] - 351:9, 397:9, 400:1, 425:19, 426:8,</p> | <p>427:23, 428:19, 429:7, 455:15, 455:17, 458:20, 458:21, 556:16, 561:6, 562:14, 562:21, 563:2, 563:4, 592:1, 593:21, 595:11, 601:1, 659:22, 674:8, 674:17, 678:17, 678:23, 684:23, 691:3</p> <p>bases [2] - 369:21, 578:23</p> <p>basic [3] - 620:8, 621:5, 622:16</p> <p>basing [1] - 670:11</p> <p>basis [4] - 396:10, 633:8, 634:24, 635:2</p> <p>bat [1] - 480:2</p> <p>battle [1] - 363:13</p> <p>became [5] - 439:12, 454:15, 498:12, 615:20, 615:23</p> <p>become [4] - 445:5, 445:20, 446:19, 567:17</p> <p>becomes [1] - 620:24</p> <p>BEFORE [1] - 348:14</p> <p>began [1] - 368:2</p> <p>begin [3] - 374:8, 374:18, 577:11</p> <p>beginning [2] - 506:24, 681:5</p> <p>begins [1] - 666:11</p> <p>behind [2] - 373:14, 678:1</p> <p>believes [2] - 563:17, 586:10</p> <p>Bell [1] - 453:17</p> <p>below [7] - 373:10, 378:1, 658:14, 672:17, 677:17, 678:14, 679:15</p> <p>Ben [2] - 394:1, 410:24</p> <p>benchmarking [1] - 560:22</p> <p>bend [1] - 498:6</p> <p>benefit [9] - 369:10, 369:19, 370:10, 370:13, 388:6, 403:12, 662:2, 662:9, 666:19</p> <p>benefits [5] - 369:15, 619:21, 626:2, 642:8, 659:5</p> <p>Berkley [1] - 638:14</p> <p>Birmingham [12] - 608:1, 608:10,</p> | <p>608:22, 609:2, 627:2, 636:22, 649:5, 649:23, 655:23, 656:22, 658:5, 658:12</p> <p>BERMINGHAM [1] - 608:13</p> <p>Bermingham's [1] - 664:5</p> <p>best [7] - 380:17, 381:1, 392:12, 392:13, 447:16, 617:8</p> <p>bet [1] - 532:9</p> <p>better [16] - 378:21, 391:10, 391:11, 398:24, 449:3, 449:4, 499:9, 503:7, 511:6, 619:8, 622:7, 623:20, 624:17, 624:18, 649:14, 651:14</p> <p>between [17] - 427:21, 460:1, 462:16, 472:3, 490:2, 492:6, 497:10, 515:16, 520:6, 520:24, 535:16, 570:16, 575:6, 577:19, 577:23, 645:17, 667:19</p> <p>beyond [3] - 453:4, 465:11, 643:3</p> <p>Bhusri [1] - 447:8</p> <p>big [10] - 357:7, 370:10, 377:13, 419:1, 437:3, 460:1, 484:20, 615:23, 668:6</p> <p>Biles [1] - 394:12</p> <p>billion [8] - 400:24, 401:2, 402:21, 402:23, 403:3, 403:4, 403:6</p> <p>billions [1] - 618:20</p> <p>binder [17] - 371:22, 376:5, 383:20, 424:20, 430:18, 433:12, 433:17, 433:21, 438:22, 450:4, 479:10, 506:1, 554:1, 609:11, 636:17, 657:17, 666:6</p> <p>binders [2] - 382:17, 564:17</p> <p>Birmingham [2] - 531:22, 656:15</p> <p>bit [32] - 383:19, 385:16, 481:13,</p> | <p>481:16, 481:24, 482:8, 498:4, 504:4, 504:24, 513:19, 526:11, 533:5, 560:18, 580:17, 584:3, 585:19, 611:7, 614:2, 620:13, 620:19, 621:11, 622:14, 626:4, 626:11, 638:8, 644:16, 656:4, 656:6, 659:13, 667:6, 681:1, 689:4</p> <p>bites [1] - 539:5</p> <p>bits [4] - 423:15, 618:15, 618:20, 622:12</p> <p>black [1] - 668:2</p> <p>Blacksburg [2] - 653:4, 654:11</p> <p>Block [6] - 682:3, 682:5, 682:6, 682:7, 682:13, 682:19</p> <p>block [5] - 454:2, 496:8, 514:10, 626:10, 680:18</p> <p>blocks [3] - 490:19, 539:3, 682:9</p> <p>Blocks [2] - 681:24, 682:16</p> <p>blog [6] - 545:5, 545:19, 545:24, 546:15, 546:24, 550:7</p> <p>blow [2] - 584:2, 665:14</p> <p>blown [2] - 661:17, 672:5</p> <p>BLUMENFELD [1] - 348:19</p> <p>board [48] - 411:7, 411:8, 411:9, 411:15, 416:10, 416:14, 418:3, 421:14, 428:12, 428:14, 428:20, 440:13, 440:16, 441:4, 444:22, 445:6, 446:20, 447:8, 468:5, 468:19, 469:24, 470:9, 470:17, 471:10, 555:17, 628:21, 641:24, 663:21, 664:2, 667:5, 667:23, 668:1, 668:17, 669:21, 669:23, 669:24, 670:15,</p> |
|---|--|---|--|--|

Hawkins Reporting Service

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(302) 658-6697 FAX (302) 658-8418

670:16, 670:17,
671:2, 678:1, 678:4,
678:8, 678:9,
686:20, 687:3, 687:4
boards [16] - 423:18,
428:17, 462:24,
471:12, 471:16,
628:12, 628:19,
658:22, 667:15,
667:20, 670:3,
670:21, 671:18,
686:23, 687:1,
687:11
body [1] - 358:2
book [5] - 491:11,
553:5, 555:18,
555:20, 555:23
bore [1] - 656:2
born [2] - 389:24,
612:11
Boston [1] - 612:1
bother [1] - 584:14
bottom [3] - 661:10,
661:18, 665:10
bought [7] - 370:20,
440:6, 445:7,
445:24, 446:9,
446:16, 457:2
box [4] - 407:6,
464:18, 619:16,
643:14
boxes [3] - 464:8,
619:13, 678:21
branded [1] - 613:13
break [7] - 386:2,
407:1, 432:19,
432:24, 531:4,
631:15, 689:12
breaks [1] - 383:12
Brian [3] - 376:18,
394:12, 690:14
brief [3] - 367:1,
434:16, 657:13
briefly [12] - 352:13,
381:10, 386:24,
393:22, 434:21,
439:8, 479:20,
492:23, 500:19,
501:19, 655:21,
676:22
bring [11] - 424:5,
468:19, 532:13,
561:16, 620:11,
632:15, 635:21,
661:8, 665:12,
673:2, 685:11
bringing [2] - 366:22,
366:23
British [3] - 483:7,
483:13, 483:19

broad [2] - 645:19,
646:1
brought [1] - 620:3
build [17] - 389:5,
389:7, 395:21,
395:23, 405:12,
405:18, 409:2,
419:9, 429:6,
429:12, 429:19,
431:17, 444:2,
449:6, 449:8,
451:15, 600:18
building [5] - 400:2,
406:11, 448:15,
473:18, 532:19
built [3] - 666:2,
666:18, 666:20
bulky [1] - 651:9
bulletin [1] - 373:11
bunch [3] - 415:5,
633:18, 663:21
burden [2] - 569:3,
630:21
business [5] - 500:16,
612:3, 615:16,
615:21, 616:2
busy [3] - 399:16,
429:13, 429:17
buy [3] - 497:23,
563:7, 599:24
BY [65] - 348:19,
348:22, 348:22,
348:23, 348:23,
349:3, 349:8, 349:9,
349:11, 349:12,
349:13, 349:13,
367:16, 372:8,
377:6, 380:5,
382:22, 384:3,
385:5, 417:7, 420:1,
424:18, 430:12,
432:2, 439:2,
445:17, 450:20,
452:3, 453:12,
454:13, 458:3,
460:20, 465:15,
474:9, 475:20,
479:16, 489:2,
506:13, 509:1,
525:13, 533:10,
545:1, 546:21,
549:12, 553:18,
554:10, 564:24,
583:5, 601:23,
604:12, 608:21,
609:23, 636:20,
642:5, 643:10,
646:16, 647:20,
649:4, 649:15,
652:13, 655:12,

661:12, 663:6,
669:18, 675:2
byte [1] - 548:18
C.A [1] - 348:6
C4 [3] - 496:9, 496:11,
496:21
cache [3] - 418:17,
418:18, 511:5
calculate [1] - 625:5
calculating [1] -
625:11
calculation [8] -
562:7, 620:20,
623:6, 627:18,
647:24, 658:11,
676:23, 677:21
calculations [3] -
561:24, 623:6,
647:23
California [6] -
397:20, 397:22,
611:11, 611:14,
616:9, 616:16
camera [26] - 411:9,
411:10, 420:20,
420:22, 424:3,
424:5, 463:5, 463:6,
463:7, 463:8, 463:9,
463:10, 463:13,
463:15, 463:16,
464:1, 464:3, 464:6,
464:7, 464:9,
464:12, 464:17,
465:17, 465:20,
466:4, 468:20
cameras [2] - 411:12,
475:23
Canada [1] - 483:23
candidly [1] - 365:17
cannot [2] - 397:7,
462:20
capabilities [1] -
659:8
capable [2] - 574:16,
574:18
capacity [23] - 485:23,
486:1, 559:22,
560:10, 561:18,
561:20, 563:7,
592:14, 592:15,
592:17, 595:8,
596:13, 598:21,
599:18, 600:4,
600:6, 600:18,
600:22, 602:7,
602:14, 602:23,
603:6, 635:15
capital [1] - 477:12
capitol [3] - 390:3,
394:9, 447:10

captioned [1] - 692:12
captured [1] - 418:5
career [4] - 392:12,
393:7, 476:21, 567:2
cartoon [2] - 572:18,
585:19
case [82] - 354:11,
354:13, 355:14,
355:23, 358:11,
358:20, 368:18,
369:4, 370:7,
379:17, 384:19,
385:9, 389:3,
392:18, 403:18,
425:22, 427:10,
428:3, 428:6,
428:23, 434:9,
436:9, 436:20,
442:1, 443:11,
465:2, 478:7, 480:3,
482:4, 485:8, 486:6,
486:19, 489:6,
489:8, 495:1,
495:18, 496:8,
497:2, 499:6, 499:8,
499:12, 499:17,
500:7, 500:14,
503:15, 504:18,
508:12, 508:15,
516:9, 524:2,
533:20, 533:22,
536:6, 547:1,
565:23, 566:9,
566:19, 566:22,
578:14, 590:5,
598:1, 603:5, 619:8,
620:19, 622:12,
622:13, 627:10,
633:9, 634:22,
638:5, 647:11,
653:16, 656:20,
681:4, 681:6, 681:8,
681:9, 688:16,
688:21, 689:6,
689:23
cases [19] - 369:11,
369:12, 369:13,
369:18, 369:21,
369:22, 370:3,
370:4, 370:11,
377:14, 379:13,
426:20, 428:4,
565:4, 567:10,
567:13, 567:22,
567:24, 619:17
cassette [1] - 395:16
Castle [1] - 692:2
catch [4] - 374:8,
374:18, 374:19,
689:16

caused [1] - 371:15
causes [1] - 543:18
CD [1] - 504:14
cell [1] - 411:11
center [6] - 395:20,
396:7, 398:18,
407:11, 514:6,
619:12
centers [5] - 395:13,
395:24, 396:14,
429:8, 429:10
central [3] - 619:16,
643:14, 649:17
CEO [5] - 439:9,
447:7, 477:11,
545:4, 555:16
certain [19] - 416:7,
428:15, 428:19,
437:24, 459:19,
467:1, 476:3,
476:10, 487:24,
503:4, 503:7, 508:9,
518:10, 539:5,
557:17, 586:11,
635:11, 648:11,
687:20
certainly [13] - 359:23,
364:14, 366:12,
370:10, 446:5,
491:9, 508:9, 532:6,
588:14, 600:8,
633:6, 635:6, 690:21
CERTIFICATE [1] -
692:5
certificate [1] - 482:20
certification [1] -
482:17
Certified [1] - 692:8
certify [1] - 692:9
challenge [5] - 399:1,
406:11, 407:9,
594:5, 595:18
challenged [3] -
435:20, 476:23,
477:4
challenges [2] -
389:6, 408:6
challenging [1] -
448:22
chance [5] - 471:5,
471:7, 580:2,
649:14, 654:10
change [7] - 427:24,
428:9, 466:24,
467:2, 533:23,
538:7, 604:11
changed [7] - 387:11,
396:9, 466:21,
467:3, 539:16,
539:21, 540:6

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

changes [18] - 373:10,
427:20, 428:7,
428:10, 476:1,
538:11, 538:13,
538:16, 538:18,
540:15, 540:22,
541:23, 542:1,
542:6, 542:13,
563:16, 563:22
changing [4] - 475:23,
540:11, 541:17,
542:18
characteristics [1] -
626:1
characterizes [1] -
523:24
charge [1] - 375:14
charging [1] - 403:9
chart [3] - 597:4,
597:6, 597:17
cheap [1] - 492:8
check [16] - 465:22,
503:2, 503:6, 503:7,
503:9, 503:10,
512:11, 515:14,
536:21, 537:2,
579:12, 596:20,
667:5, 677:23,
678:14, 678:20
checked [4] - 465:19,
524:18, 524:19,
664:3
checking [5] - 523:18,
572:1, 572:3, 572:4,
575:13
checkmark [3] -
506:23, 510:6,
529:20
checks [4] - 502:21,
503:1, 518:9, 536:20
chest [1] - 484:20
chief [2] - 439:13,
554:13
China [11] - 389:24,
390:1, 390:5,
390:13, 390:18,
391:5, 391:6, 391:8,
391:13, 391:18,
392:8
Chinese [1] - 390:14
chip [2] - 612:21,
612:23
chips [3] - 407:19,
662:14, 668:3
choice [1] - 541:4
Chongqing [1] - 390:2
choose [1] - 492:2
chose [3] - 360:9,
593:15, 599:12
Chris [2] - 610:9,

637:3
Christopher [1] -
637:2
chunk [1] - 630:9
chunks [1] - 622:4
circle [1] - 392:4
circuit [4] - 612:20,
686:23, 687:1, 687:3
circuits [1] - 483:17
circumventing [1] -
634:6
cite [1] - 361:7
cited [4] - 579:21,
580:10, 580:13,
580:17
cites [1] - 361:8
city [1] - 390:2
City [3] - 482:11,
482:17, 482:20
claim [123] - 361:1,
438:4, 470:15,
471:23, 481:5,
481:7, 481:11,
503:14, 503:17,
503:19, 503:22,
504:1, 504:5,
506:21, 506:23,
507:3, 507:9,
507:11, 507:17,
509:14, 509:18,
509:23, 510:9,
511:1, 511:21,
511:23, 513:2,
521:7, 521:14,
522:5, 522:23,
523:1, 523:6,
525:24, 527:3,
527:5, 527:8, 528:1,
528:7, 528:15,
528:24, 529:22,
530:1, 530:4, 530:7,
530:13, 533:14,
535:4, 535:5,
535:21, 535:22,
536:2, 536:13,
537:6, 538:8, 540:8,
540:9, 568:23,
569:9, 569:13,
569:18, 569:21,
570:1, 570:5,
570:19, 570:21,
570:22, 571:15,
571:20, 571:23,
584:7, 587:11,
589:1, 589:3,
605:16, 606:1,
606:4, 606:8, 606:9,
606:14, 606:18,
626:24, 627:9,
627:13, 628:2,

663:12, 663:23,
664:11, 665:9,
665:16, 665:24,
667:11, 668:4,
668:12, 668:14,
668:19, 668:22,
672:16, 672:18,
672:21, 675:4,
676:5, 677:17,
677:24, 678:13,
679:2, 682:23,
682:24, 683:13,
683:14, 683:20,
683:21, 684:11,
684:12, 684:14,
684:23, 685:18,
686:11, 686:13,
687:20, 687:23
Claim [17] - 512:5,
512:13, 513:9,
513:12, 529:13,
552:16, 658:4,
677:16, 679:2,
685:12, 685:13,
686:5, 686:8,
686:13, 686:15,
686:16, 687:15
claimed [4] - 556:12,
606:14, 665:17,
665:24
claims [47] - 360:20,
360:21, 419:19,
420:5, 428:22,
460:11, 460:22,
461:3, 461:4, 461:8,
461:14, 461:15,
461:20, 462:2,
462:10, 462:16,
470:8, 470:11,
471:3, 471:9,
471:12, 471:17,
471:19, 472:3,
472:6, 472:11,
529:11, 534:9,
534:17, 534:21,
543:6, 552:10,
552:12, 554:19,
555:1, 627:9,
657:15, 658:3,
660:8, 660:11,
663:19, 664:12,
664:16, 670:8,
670:16, 679:12,
688:1
clarify [2] - 642:1,
649:12
classes [2] - 487:8,
654:19
cleaned [1] - 633:13
clear [17] - 355:14,

373:13, 387:6,
401:19, 428:18,
455:22, 459:18,
470:3, 475:24,
477:7, 480:1,
575:15, 631:6,
641:18, 644:2,
651:3, 676:14
cleared [1] - 497:24
Clemson [1] - 653:22
CLERK [2] - 478:24,
608:8
clock [1] - 502:13
close [3] - 465:1,
472:12, 569:20
closer [2] - 615:20,
624:16
co [12] - 393:20,
393:23, 394:1,
410:24, 411:20,
471:20, 617:16,
620:7, 622:17,
623:10, 630:24,
637:4
co-founder [1] -
410:24
co-founders [3] -
393:20, 393:23,
394:1
co-inventor [2] -
411:20, 471:20
co-inventors [6] -
617:16, 620:7,
622:17, 623:10,
630:24, 637:4
coalesced [1] - 454:2
coast [1] - 611:13
Cobb [12] - 363:16,
364:1, 367:3,
367:17, 368:17,
370:20, 375:19,
377:10, 378:16,
379:20, 380:6, 382:2
code [80] - 361:8,
397:9, 505:11,
505:12, 505:13,
505:16, 518:18,
527:23, 528:23,
540:11, 541:6,
541:17, 542:23,
572:22, 573:2,
573:4, 579:3,
579:20, 579:21,
580:6, 580:13,
580:18, 581:1,
581:5, 581:9,
581:12, 581:21,
582:8, 582:14,
582:19, 583:4,
583:7, 583:10,

583:18, 584:2,
584:4, 584:5,
584:19, 584:21,
584:24, 585:5,
585:12, 585:15,
585:24, 586:3,
586:24, 588:1,
588:2, 588:8,
588:18, 588:22,
589:6, 589:16,
589:21, 590:3,
590:7, 593:12,
593:23, 594:17,
594:24, 603:15,
603:17, 603:22,
604:2, 604:5,
604:14, 604:22,
607:3, 607:8,
607:10, 607:11,
607:14, 659:23,
671:8, 672:12,
674:12, 677:5,
683:9, 683:12
coding [1] - 541:21
cofounders [5] -
385:24, 386:19,
439:6, 477:22, 478:1
cog [1] - 514:23
coined [1] - 387:18
coinventor [1] -
461:12
cold [1] - 561:19
coldest [1] - 561:12
colleague [3] -
356:24, 478:22,
608:2
colleagues [9] -
399:20, 404:16,
409:6, 410:19,
448:10, 501:9,
502:18, 551:4,
688:24
collection [1] - 656:12
College [1] - 612:2
college [7] - 390:5,
390:12, 487:1,
568:6, 568:7,
611:15, 611:22
column [3] - 627:1,
639:10, 670:13
columns [1] - 538:3
combination [1] -
629:20
combined [3] - 410:4,
658:17, 659:2
coming [9] - 352:9,
364:1, 373:20,
409:15, 494:4,
514:4, 524:16,
560:4, 608:1

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|---|--|--|--|--|
| comments [1] - 632:3 | 637:21 | 407:2, 407:7, 408:22, 408:23, 409:16, 409:18, 409:20, 410:2, 410:5, 410:6, 410:7, 448:15, 473:6, 473:12 | 476:7 | 677:4 |
| commercial [19] - 350:19, 351:1, 351:8, 352:1, 352:14, 352:20, 352:21, 354:5, 354:13, 361:18, 362:10, 389:8, 449:6, 449:8, 451:15, 550:22, 554:22, 555:3, 556:13 | comparable [1] - 595:14 | comprised [1] - 628:19 | concentrate [1] - 688:22 | confirms [1] - 672:13 |
| commercialize [4] - 443:21, 443:23, 444:7, 446:8 | compare [5] - 471:11, 471:12, 519:2, 525:4, 525:5 | comprises [1] - 676:7 | concept [13] - 405:3, 405:5, 405:10, 420:17, 536:20, 618:1, 626:6, 627:22, 629:14, 644:18, 645:19, 646:1, 681:2 | conflict [1] - 395:5 |
| commercially [1] - 362:16 | compared [5] - 369:20, 470:8, 470:15, 605:3, 660:11 | comprising [4] - 504:8, 507:5, 535:9, 535:10 | conception [3] - 352:6, 360:3, 434:17 | confusion [1] - 585:5 |
| common [2] - 391:12, 391:15 | compares [3] - 482:22, 517:7, 519:3 | compromised [1] - 398:6 | concern [3] - 371:18, 415:17, 437:18 | conjunction [1] - 592:21 |
| commonly [2] - 625:4, 644:20 | comparing [7] - 396:5, 406:23, 518:3, 518:13, 518:14, 575:23, 663:18 | computation [5] - 629:8, 672:24, 673:6, 673:17, 677:11 | concerned [10] - 366:14, 371:16, 375:11, 375:15, 375:18, 414:10, 414:14, 414:15, 415:9, 436:15 | connection [9] - 369:4, 440:9, 526:23, 565:23, 571:2, 572:22, 578:13, 579:22, 584:7 |
| communicate [1] - 557:12 | comparison [8] - 460:8, 462:10, 462:16, 471:24, 472:2, 518:19, 519:5, 605:3 | computed [2] - 658:13, 676:18 | concerning [2] - 375:21, 637:8 | consider [8] - 392:7, 552:22, 553:1, 553:19, 554:13, 561:24, 604:6, 607:10 |
| community [1] - 403:24 | compensate [1] - 557:5 | computer [44] - 388:16, 466:1, 481:20, 482:14, 485:10, 487:8, 488:11, 489:14, 491:9, 495:10, 495:11, 504:6, 504:7, 504:8, 504:10, 504:12, 504:14, 504:15, 504:19, 507:1, 519:17, 526:7, 527:19, 527:20, 560:21, 561:21, 582:5, 606:9, 612:21, 612:23, 630:15, 638:13, 644:21, 652:18, 652:24, 653:21, 653:24, 654:4, 654:8, 654:22, 662:14, 679:23, 684:7 | concerns [6] - 366:5, 373:23, 374:2, 380:9, 380:15, 452:14 | consideration [1] - 361:20 |
| compact [1] - 408:18 | compensation [1] - 653:14 | computers [5] - 488:4, 490:1, 490:10, 490:13, 492:6 | conclude [1] - 675:8 | considered [2] - 534:6, 560:15 |
| companies [7] - 426:22, 428:4, 446:16, 488:12, 489:13, 489:17, 617:8 | compete [2] - 351:20, 398:20 | Computing [1] - 641:3 | concluded [6] - 483:3, 534:11, 534:12, 675:10, 676:9, 676:10 | considering [2] - 560:7, 562:5 |
| COMPANY [1] - 348:3 | competing [1] - 673:10 | computing [2] - 625:9, 677:10 | conclusion [6] - 379:10, 581:6, 581:20, 659:20, 660:12, 660:14 | consist [1] - 504:15 |
| company [55] - 375:20, 386:1, 386:20, 394:12, 394:14, 394:16, 394:20, 397:6, 397:16, 397:21, 399:6, 399:23, 400:18, 413:10, 417:16, 429:4, 429:5, 439:9, 439:17, 445:7, 445:24, 446:4, 446:9, 446:11, 446:13, 456:23, 457:1, 457:10, 457:12, 472:16, 473:10, 477:18, 483:8, 486:12, 487:13, 487:14, 487:21, 488:8, 492:1, 493:7, 560:11, 613:20, 616:8, 616:12, 616:16, 616:21, 617:2, 617:3, 642:13, 642:14, 642:18, 642:21 | competition [3] - 376:8, 379:5, 379:14 | conceived [18] - 410:21, 417:9, 417:19, 417:24, 419:18, 420:4, 420:10, 422:13, 425:11, 426:11, 426:15, 428:22, 429:1, 429:15, 435:6, 472:1, 476:4 | conclusively [1] - 510:22 | consistent [4] - 547:11, 548:3, 556:10, 675:19 |
| company's [1] - | complete [1] - 404:18 | | condition [1] - 365:23 | consisting [1] - 490:6 |
| | completely [6] - 542:17, 564:4, 585:3, 585:4, 585:13, 616:9 | | conduct [2] - 436:20, 438:4 | constitutes [4] - 525:15, 586:3, 589:5, 593:13 |
| | completeness [1] - 423:22 | | confer [1] - 364:22 | constituting [1] - 573:19 |
| | complex [1] - 518:23 | | Conference [1] - 641:4 | construction [17] - 507:10, 507:18, 507:20, 508:4, 508:14, 508:19, 509:3, 509:11, 510:15, 512:20, 571:20, 668:14, 668:16, 682:24, 683:15, 683:21, 683:22 |
| | components [2] - 443:10, 615:10 | | conference [10] - 434:18, 449:14, 449:15, 449:21, 450:23, 451:9, 568:9, 568:13, 568:16, 637:13 | construed [4] - 507:23, 508:17, 511:1, 537:13 |
| | compound [1] - 410:6 | | conferring [1] - 364:21 | consultant [1] - 441:13 |
| | compress [1] - 422:10 | | confess [1] - 412:12 | consulting [1] - 441:23 |
| | compressed [1] - 553:21 | | configuration [1] - 419:9 | consume [3] - 396:12, 410:13, 619:16 |
| | compression [30] - 370:3, 370:6, 370:9, 370:12, 370:16, 387:16, 388:15, 388:19, 398:22, 399:3, 405:6, 405:7, 406:20, 406:24 | | confirm [5] - 417:23, 419:17, 422:12, 437:14, 456:9 | consumes [1] - 625:13 |
| | | | confirmed [2] - 664:1, | consuming [1] - 399:15 |
| | | | | consumption [1] - |

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

454:2
Cont'd [1] - 349:1
contact [1] - 532:19
contain [2] - 516:8, 671:23
container [1] - 418:18
contains [4] - 514:11, 516:15, 516:17, 536:8
contemplation [1] - 423:16
content [5] - 458:21, 514:15, 515:7, 515:9, 548:17
contention [1] - 437:20
contents [3] - 517:7, 524:18, 524:19
context [10] - 368:19, 403:14, 409:19, 614:15, 614:16, 614:22, 629:23, 630:6, 646:6, 662:20
continue [4] - 364:21, 366:21, 367:12, 478:1
continued [3] - 403:1, 444:21, 616:3
contract [2] - 440:21, 488:10
contribute [1] - 439:21
contributed [1] - 474:11
contributing [1] - 473:2
contributors [1] - 376:22
control [5] - 514:5, 626:14, 628:24, 629:24, 645:1
controller [19] - 490:7, 491:5, 491:6, 491:8, 494:7, 494:24, 496:8, 496:9, 497:3, 514:22, 524:17, 535:18, 536:6, 575:17, 575:20, 576:5, 576:10, 576:12, 576:24
convenient [1] - 669:6
convention [4] - 427:24, 428:9, 435:23
conversation [1] - 602:22
convince [1] - 357:1
convinced [1] - 429:8
copied [1] - 436:17
copies [6] - 454:1,

479:13, 495:5, 495:18, 501:6, 618:8
copied [1] - 501:21
copper [1] - 490:5
copy [10] - 353:14, 493:3, 493:11, 493:13, 495:7, 497:6, 618:4, 618:9, 622:11, 641:7
core [1] - 482:19
corner [7] - 379:3, 418:17, 500:5, 609:24, 652:6, 663:20, 667:24
corners [1] - 436:11
corporation [1] - 488:5
CORPORATION [1] - 348:3
Correct [2] - 637:6, 648:14
correct [216] - 354:10, 358:4, 368:4, 368:8, 369:1, 369:2, 369:6, 369:7, 369:10, 369:14, 369:15, 369:19, 370:1, 370:5, 370:11, 370:17, 370:18, 371:6, 371:17, 372:13, 372:14, 372:16, 372:20, 373:8, 373:24, 374:6, 375:8, 376:3, 376:9, 376:10, 376:24, 377:12, 377:19, 378:11, 378:12, 379:7, 402:1, 439:6, 440:10, 441:1, 442:3, 442:8, 444:3, 444:16, 444:23, 445:3, 446:2, 449:11, 449:19, 450:24, 451:4, 452:15, 454:16, 455:4, 455:9, 455:16, 455:20, 455:24, 456:7, 457:4, 457:12, 457:17, 457:22, 460:9, 460:23, 462:5, 465:17, 465:20, 465:23, 465:24, 466:6, 466:19, 468:12, 470:20, 480:4, 480:7, 480:17, 482:5, 496:15, 496:16, 498:20,

519:6, 519:14, 520:3, 526:3, 534:5, 538:10, 540:20, 542:8, 544:2, 547:17, 547:24, 550:3, 550:4, 563:19, 563:20, 563:24, 564:1, 564:5, 564:6, 564:9, 565:4, 565:13, 566:4, 566:14, 567:2, 567:4, 567:11, 567:15, 567:16, 567:22, 568:18, 568:19, 569:1, 569:6, 569:7, 569:19, 570:14, 571:3, 571:6, 571:14, 571:24, 572:12, 573:7, 573:10, 573:13, 573:15, 573:21, 573:22, 576:16, 576:17, 577:1, 577:11, 577:20, 578:14, 578:24, 579:11, 579:23, 580:1, 580:3, 580:21, 580:22, 581:3, 581:7, 582:12, 582:16, 583:13, 583:16, 584:9, 584:13, 584:17, 585:8, 585:17, 585:21, 587:1, 587:10, 587:14, 587:21, 588:21, 589:8, 589:10, 589:13, 589:14, 589:23, 590:1, 590:10, 590:12, 590:16, 591:7, 591:14, 591:24, 592:4, 592:5, 592:15, 593:24, 594:7, 595:1, 596:1, 596:5, 597:18, 599:1, 599:4, 609:4, 609:5, 609:18, 612:4, 613:17, 613:18, 614:13, 615:17, 626:22, 638:6, 638:11, 638:12, 638:15, 639:21, 640:1, 640:4, 640:7, 640:23, 642:11, 643:1, 643:2, 643:19, 644:1, 644:19, 648:4,

649:20, 657:2, 660:9, 674:5, 677:15, 679:5, 686:12
corrected [1] - 511:24
correction [1] - 511:21
correspond [1] - 671:20
correspondence [1] - 414:22
corresponding [1] - 677:24
corroborating [1] - 415:22
corroboration [1] - 416:21
corrupted [2] - 614:19, 621:12
CORY [1] - 349:12
COS [1] - 422:10
cost [24] - 398:13, 398:18, 403:17, 403:18, 405:19, 406:16, 406:18, 406:21, 406:22, 406:23, 407:5, 407:7, 614:10, 614:12, 615:3, 615:5, 615:6, 618:14, 618:21, 619:8, 619:20, 619:23
costly [1] - 619:9
costs [3] - 408:8, 615:11, 618:21
counsel [2] - 523:17, 649:6
Counsel [2] - 349:4, 349:14
country [3] - 390:4, 392:11, 392:12
County [1] - 692:2
couple [6] - 402:10, 439:9, 523:12, 619:19, 641:18, 687:20
course [17] - 355:1, 434:11, 442:1, 537:9, 566:1, 567:1, 567:12, 568:5, 578:4, 598:16, 599:22, 610:14, 619:15, 644:17, 648:2, 648:12, 671:7
court [3] - 352:23, 511:24, 691:16
COURT [193] - 348:1, 350:1, 350:6, 350:10, 350:13, 352:11, 352:16,

353:12, 353:19, 354:6, 354:16, 355:5, 355:9, 355:16, 356:8, 356:16, 357:3, 357:9, 357:18, 358:1, 358:7, 358:16, 358:21, 359:5, 359:7, 359:15, 359:21, 360:11, 360:15, 360:18, 360:23, 361:2, 361:10, 362:12, 362:17, 362:23, 363:3, 363:7, 363:11, 363:20, 363:24, 364:3, 364:6, 364:13, 364:16, 365:6, 366:1, 366:8, 366:20, 367:2, 367:8, 372:6, 377:4, 380:3, 380:22, 382:1, 382:5, 382:10, 382:18, 382:20, 384:1, 385:1, 412:2, 412:6, 412:9, 412:22, 413:1, 413:6, 413:11, 413:17, 413:19, 414:2, 414:13, 414:18, 415:3, 415:16, 416:4, 416:13, 416:19, 416:24, 417:1, 419:23, 424:16, 430:10, 431:24, 432:18, 432:23, 433:5, 433:7, 433:13, 433:24, 434:11, 434:24, 435:13, 435:19, 436:14, 437:5, 437:15, 438:6, 438:11, 438:15, 438:23, 445:15, 450:18, 451:20, 451:24, 452:23, 453:8, 454:8, 458:2, 458:8, 460:17, 461:17, 465:10, 474:2, 475:17, 478:13, 478:18, 479:11, 479:14, 488:24, 506:11, 507:14, 508:11, 525:11, 530:23, 531:3, 531:9, 531:18, 531:24, 532:8, 532:12, 532:17,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|---|---|--|---|---|
| 533:1, 544:23, 546:10, 546:19, 549:8, 553:16, 554:8, 564:12, 564:15, 564:19, 564:22, 583:1, 601:19, 604:10, 604:19, 607:18, 607:22, 608:4, 608:19, 609:21, 631:12, 631:24, 633:19, 634:10, 634:14, 635:1, 635:8, 635:20, 636:2, 636:7, 636:11, 636:19, 641:14, 641:19, 642:3, 643:5, 645:22, 646:14, 647:9, 647:15, 648:24, 649:13, 649:22, 650:4, 650:8, 651:7, 651:20, 652:2, 652:8, 655:10, 663:4, 669:16, 674:24, 688:3, 688:7, 690:2, 690:8, 690:17, 690:23, 691:13 Court [24] - 348:15, 357:1, 357:5, 364:23, 468:11, 479:13, 488:20, 507:9, 507:12, 508:20, 509:2, 509:8, 510:14, 510:20, 510:21, 511:14, 511:21, 512:19, 537:4, 537:13, 571:4, 670:24, 687:21, 687:24 Court's [7] - 509:17, 571:20, 668:14, 668:22, 680:13, 683:14, 683:22 courtroom [8] - 438:13, 531:7, 532:18, 532:23, 544:9, 550:21, 655:22, 689:7 Courtroom [1] - 348:11 cover [8] - 437:16, 454:21, 481:15, 610:1, 640:15, 658:18, 660:2, 661:9 covered [5] - 476:13, 589:4, 654:16, | 677:16, 677:19 covering [1] - 657:12 covers [1] - 658:12 CPU [1] - 407:22 create [4] - 392:13, 399:2, 437:23, 505:14 created [5] - 420:20, 420:21, 429:2, 466:17, 519:18 creating [2] - 438:3, 592:20 credibility [2] - 374:12, 651:6 cross [5] - 363:17, 367:13, 376:5, 564:12, 691:4 CROSS [2] - 439:1, 564:23 cross-examination [5] - 363:17, 367:13, 376:5, 564:12, 691:4 CROSS- EXAMINATION [2] - 439:1, 564:23 crowded [4] - 377:22, 379:4, 379:14, 379:22 CRUTCHER [1] - 348:21 curative [3] - 350:17, 351:3, 352:5 cure [1] - 351:3 current [2] - 419:15, 458:19 Curve [1] - 407:17 customer [17] - 368:24, 398:2, 409:16, 486:5, 506:18, 562:8, 562:20, 567:18, 595:8, 600:21, 601:7, 602:12, 602:18, 602:21, 613:7, 614:20, 615:23 customers [22] - 409:9, 484:3, 485:21, 485:24, 486:21, 487:7, 559:8, 560:5, 562:6, 562:22, 563:1, 563:10, 592:18, 592:19, 594:3, 595:20, 600:12, 600:19, 600:24, 601:11, 603:2, 613:7 customers' [3] - 397:8, 614:18, 619:12 | cut [5] - 355:18, 489:20, 565:19, 632:19, 634:7 Dale [3] - 692:7, 692:19, 692:20 damages [5] - 351:9, 356:6, 482:3, 690:10, 690:14 data [241] - 368:14, 369:3, 369:4, 369:9, 369:12, 369:17, 369:21, 369:23, 369:24, 370:2, 370:3, 370:10, 370:16, 387:4, 387:5, 387:13, 388:11, 388:17, 388:22, 388:24, 395:13, 395:19, 395:24, 396:7, 396:11, 396:13, 396:17, 396:21, 396:23, 397:1, 397:2, 397:6, 397:21, 398:3, 398:17, 398:18, 399:4, 405:9, 406:19, 407:9, 407:11, 407:15, 407:16, 407:17, 407:22, 408:1, 408:3, 408:9, 408:12, 408:13, 408:14, 408:15, 408:18, 408:20, 409:1, 409:15, 410:1, 410:4, 410:13, 410:15, 418:20, 418:22, 418:23, 418:24, 419:4, 419:11, 419:13, 429:8, 429:10, 436:4, 442:18, 448:14, 452:14, 453:6, 481:20, 483:17, 489:14, 489:17, 489:22, 490:2, 490:3, 490:15, 490:18, 490:20, 490:24, 491:3, 491:7, 491:12, 491:15, 491:17, 492:18, 493:2, 494:4, 494:12, 495:16, 495:19, 496:3, 496:6, 496:7, 496:21, 496:23, 497:12, 497:14, 497:22, 497:23, | 498:19, 499:15, 499:22, 500:22, 501:3, 501:7, 501:11, 501:21, 502:5, 502:9, 502:16, 502:22, 503:8, 504:6, 504:12, 507:4, 507:5, 507:6, 509:9, 510:12, 511:8, 511:23, 511:24, 512:16, 512:17, 514:3, 514:10, 514:11, 514:13, 515:7, 515:12, 515:18, 515:23, 516:14, 517:12, 518:9, 518:10, 518:15, 519:3, 520:15, 521:12, 521:18, 521:19, 524:16, 527:15, 535:9, 535:10, 535:12, 535:15, 535:16, 535:17, 535:19, 535:21, 536:1, 536:8, 536:15, 539:3, 539:14, 543:16, 548:24, 549:2, 560:3, 560:6, 561:1, 561:5, 561:7, 562:3, 562:4, 562:15, 563:3, 563:4, 571:17, 592:19, 595:11, 595:12, 595:19, 595:23, 596:7, 597:22, 597:24, 598:19, 601:3, 602:4, 603:5, 603:18, 605:4, 610:18, 610:21, 610:24, 613:9, 614:16, 614:18, 615:1, 615:9, 617:13, 617:18, 617:24, 618:3, 618:8, 618:15, 619:12, 620:19, 621:2, 621:10, 621:12, 621:21, 621:24, 622:4, 622:5, 622:11, 629:8, 629:10, 654:15, 654:21, 655:8, 656:15, 657:9, 659:6, 666:1, 676:8, 676:12, 681:8, 681:21, 682:9 Data [126] - 350:19, | 351:10, 351:11, 351:18, 352:14, 355:15, 355:23, 356:10, 356:11, 356:18, 356:21, 357:10, 357:13, 357:15, 357:16, 358:8, 368:7, 384:11, 385:16, 385:20, 386:19, 386:23, 386:24, 387:2, 387:7, 387:19, 387:21, 388:2, 388:3, 389:14, 389:17, 393:15, 393:24, 395:10, 397:4, 399:7, 399:19, 400:3, 400:8, 400:12, 400:15, 400:18, 401:14, 401:19, 402:19, 403:1, 403:5, 403:21, 404:1, 404:6, 411:20, 426:21, 432:4, 432:8, 439:6, 439:24, 440:6, 440:12, 442:6, 442:11, 442:24, 443:5, 443:20, 444:5, 444:7, 445:2, 445:23, 448:10, 457:2, 465:7, 472:15, 472:21, 473:7, 473:16, 473:18, 473:21, 474:6, 475:8, 477:9, 477:13, 499:24, 500:2, 500:4, 500:6, 500:8, 500:12, 500:17, 550:22, 551:4, 551:7, 551:8, 551:18, 551:20, 551:22, 552:2, 552:4, 552:6, 552:10, 552:16, 552:21, 552:23, 553:1, 553:7, 553:9, 553:20, 554:12, 554:14, 554:15, 554:18, 554:23, 555:2, 555:3, 555:8, 555:16, 556:2, 556:8, 556:9, 556:13, 556:14, 589:12, 589:16, 590:3, 590:17, 592:6 databases [1] - 490:12 date [40] - 351:6, 378:8, 410:21, |
|---|---|--|---|---|

Hawkins Reporting Service⁹

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

413:7, 413:16,
415:13, 415:20,
416:7, 416:14,
416:15, 421:6,
421:7, 421:10,
421:13, 421:21,
421:23, 421:24,
422:18, 422:19,
422:23, 423:2,
423:5, 423:7,
423:22, 454:22,
454:23, 455:3,
455:7, 455:12,
455:13, 456:7,
465:1, 465:17,
466:3, 466:10,
466:24, 467:2,
470:4, 558:6
dated [3] - 376:11,
411:22, 455:23
dates [8] - 427:4,
427:8, 431:14,
455:2, 455:11,
465:20, 465:23,
466:6
dating [1] - 551:14
David [1] - 366:7
DAVID [2] - 349:9,
349:13
days [23] - 404:14,
439:22, 444:15,
468:17, 469:24,
477:9, 561:15,
561:19, 595:24,
596:15, 596:16,
596:23, 598:4,
598:9, 598:12,
598:15, 598:19,
599:11, 599:12,
599:19, 601:13,
604:1, 607:13
DDR [1] - 357:15
DDUP [1] - 432:11
deal [7] - 353:22,
355:22, 440:9,
623:5, 634:5, 634:8,
634:11
dealing [4] - 625:23,
629:5, 630:16, 650:9
deals [2] - 365:1,
610:23
dealt [1] - 645:16
decades [3] - 396:19,
448:16, 611:12
December [3] -
431:14, 454:16,
454:22
decide [4] - 408:13,
408:20, 560:21,
592:21

decided [4] - 355:6,
394:20, 520:21,
521:10
decides [1] - 491:12
deciding [1] - 510:22
decision [3] - 398:16,
447:21, 517:15
dedup [1] - 364:12
dedupe [5] - 378:3,
382:8, 432:11,
593:11, 605:3
deduplicable [1] -
369:14
deduplicate [1] -
369:21
deduplicated [7] -
502:22, 516:5,
516:7, 517:2,
520:20, 520:22,
548:24
deduplication [189] -
354:11, 354:15,
356:1, 368:3, 368:6,
368:15, 369:9,
369:16, 369:19,
377:16, 378:11,
387:3, 387:15,
387:19, 387:22,
387:24, 388:2,
388:8, 388:9,
388:10, 388:20,
389:1, 389:2, 389:5,
389:10, 389:21,
399:24, 400:4,
400:5, 400:17,
400:19, 403:24,
404:6, 404:13,
404:17, 405:3,
405:5, 405:9,
405:12, 405:23,
406:3, 406:12,
409:20, 409:22,
409:23, 410:7,
423:11, 432:12,
434:22, 436:5,
442:21, 448:12,
448:19, 449:2,
453:6, 453:11,
453:15, 454:4,
473:11, 473:19,
474:7, 474:8,
474:23, 478:22,
480:2, 481:16,
481:18, 489:11,
492:19, 492:21,
492:24, 493:1,
493:10, 493:12,
493:17, 493:20,
493:22, 493:23,
494:6, 494:20,

494:22, 495:4,
495:22, 495:23,
496:1, 496:2,
496:13, 497:11,
497:15, 497:16,
498:12, 498:15,
498:21, 498:22,
499:1, 499:10,
500:20, 500:23,
500:24, 502:19,
513:20, 513:22,
514:1, 514:19,
516:1, 517:4,
520:14, 521:16,
537:22, 538:8,
538:14, 538:19,
539:17, 540:7,
540:15, 540:23,
540:24, 541:9,
542:17, 542:19,
542:20, 543:3,
543:5, 543:10,
543:11, 543:13,
543:16, 543:22,
543:23, 544:10,
545:7, 545:10,
545:11, 545:12,
545:15, 547:5,
547:12, 547:15,
547:16, 547:19,
547:23, 548:4,
548:17, 549:1,
549:2, 549:24,
550:9, 550:15,
550:19, 551:2,
551:8, 554:24,
555:8, 556:1,
556:11, 556:20,
557:3, 557:6, 557:8,
557:16, 557:19,
557:22, 557:24,
558:3, 558:7,
558:10, 558:18,
558:24, 559:2,
559:8, 559:14,
559:19, 563:18,
564:4, 580:7,
580:11, 580:18,
581:1, 581:12,
581:22, 588:8,
592:24, 594:6,
603:3, 643:1, 643:6
Deduplication [2] -
357:15, 357:17
Defendant [1] - 348:8
Defendants [1] -
349:14
deficit [1] - 374:11
define [1] - 511:18
defined [7] - 403:24,

509:8, 510:21,
512:23, 571:4, 671:1
defining [1] - 510:20
definition [7] - 409:23,
507:9, 571:7,
668:13, 679:14,
679:20, 680:14
degree [8] - 390:15,
392:1, 465:4,
482:23, 483:4,
611:23, 612:6, 654:2
degrees [2] - 561:14,
611:21
DELAWARE [1] -
348:1
Delaware [2] - 348:13,
692:1
delay [5] - 371:14,
498:14, 498:17,
502:9, 511:12
delete [1] - 495:5
deleting [1] - 495:6
deliver [6] - 522:10,
525:20, 571:12,
586:20, 587:12,
604:15
delivered [2] - 524:23,
571:18
delivering [13] -
512:24, 521:18,
523:2, 525:7,
525:15, 526:1,
526:23, 527:9,
529:18, 571:13,
571:19, 577:7, 604:6
delivers [1] - 521:22
demand [2] - 602:8,
602:13
demands [1] - 563:1
demean [1] - 572:18
demonstrating [1] -
669:11
demonstrative [2] -
524:8, 524:13
demonstratives [1] -
632:6
department [2] -
486:15, 616:14
Department [3] -
483:1, 483:2, 654:5
dependent [10] -
460:22, 461:8,
461:14, 461:15,
461:19, 462:16,
471:16, 471:23,
472:5, 686:13
depicted [2] - 669:1,
672:3
depicting [1] - 379:21
depicts [1] - 618:2

deployed [1] - 429:9
deponent [4] - 382:13,
479:6, 608:14,
651:22
depos [1] - 634:3
deposed [7] - 360:8,
635:14, 637:7,
637:12, 637:24,
638:2, 638:5
deposition [21] -
441:16, 457:14,
457:18, 458:1,
458:14, 459:14,
463:17, 467:23,
469:8, 472:8,
472:12, 472:13,
547:1, 547:4,
547:10, 581:19,
635:3, 637:16,
671:9, 671:12,
672:12
depositions [4] -
364:8, 505:21,
505:22, 650:10
deputy [2] - 532:18,
532:19
describe [12] - 368:24,
406:5, 408:19,
422:4, 423:13,
470:21, 501:5,
588:14, 588:17,
614:22, 630:4, 682:8
described [18] - 371:9,
379:22, 397:14,
409:4, 418:18,
419:4, 428:11,
428:12, 453:19,
494:3, 499:5, 511:5,
520:10, 542:19,
569:21, 573:19,
663:16, 678:12
describes [4] - 421:4,
495:9, 524:4, 659:24
describing [4] - 425:5,
499:8, 580:6, 661:24
description [5] -
406:14, 420:18,
501:5, 657:4, 657:7
design [11] - 422:9,
425:21, 425:23,
487:23, 612:16,
612:17, 613:24,
614:2, 683:11,
687:10
designated [1] - 632:9
designating [1] -
634:3
designed [4] - 437:20,
504:11, 505:3, 662:3
designers [1] - 518:23

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|---|--|--|---|---|
| <p>designing [1] - 429:11</p> <p>designs [3] - 534:2, 534:3, 600:14</p> <p>desirable [1] - 502:3</p> <p>desktop [2] - 377:10, 388:16</p> <p>despite [2] - 371:7, 631:13</p> <p>detail [10] - 362:11, 364:1, 365:10, 423:10, 434:21, 658:18, 662:24, 664:21, 665:8, 665:10</p> <p>detailed [1] - 373:10</p> <p>details [3] - 435:8, 448:6, 596:20</p> <p>deteriorates [1] - 469:10</p> <p>determine [6] - 471:24, 502:22, 516:19, 518:19, 663:11, 679:17</p> <p>determined [6] - 512:17, 516:10, 516:18, 521:20, 523:3, 525:6</p> <p>determines [2] - 517:10, 520:15</p> <p>determining [4] - 510:8, 510:10, 510:21, 536:14</p> <p>develop [3] - 404:16, 425:14, 615:7</p> <p>developed [6] - 389:14, 405:22, 444:14, 483:15, 630:24, 633:2</p> <p>developing [7] - 371:19, 400:4, 429:19, 486:15, 487:7, 488:1, 619:5</p> <p>development [1] - 487:4</p> <p>device [11] - 484:21, 504:13, 571:22, 572:19, 573:1, 575:17, 578:6, 581:2, 590:18, 592:12, 595:9</p> <p>devices [9] - 408:4, 466:1, 491:16, 557:13, 558:8, 593:1, 596:3, 596:18, 618:21</p> <p>diagram [11] - 514:2, 514:8, 525:15, 525:18, 535:14, 626:6, 668:24, 670:14, 672:3,</p> | <p>674:17</p> <p>Dietzen [4] - 545:3, 546:23, 547:14, 548:2</p> <p>Dietzen's [2] - 546:24, 548:14</p> <p>difference [2] - 459:8, 460:1</p> <p>differences [1] - 459:20</p> <p>different [46] - 354:17, 368:21, 378:10, 387:8, 445:24, 446:1, 449:1, 453:24, 461:7, 467:11, 495:2, 495:21, 495:24, 519:19, 530:3, 547:18, 562:9, 565:8, 566:3, 567:10, 567:23, 567:24, 587:20, 590:22, 590:24, 591:9, 594:16, 596:17, 603:11, 616:9, 616:14, 619:15, 628:9, 629:1, 642:17, 645:17, 646:5, 646:9, 647:16, 666:12, 684:5, 685:16, 686:20</p> <p>differently [1] - 563:18</p> <p>difficult [5] - 395:19, 409:3, 429:22, 594:13, 624:21</p> <p>difficulties [3] - 498:11, 498:24, 499:2</p> <p>digit [2] - 428:6, 428:8</p> <p>digital [3] - 411:8, 411:10, 424:3</p> <p>Digital [1] - 642:19</p> <p>digitally [1] - 483:17</p> <p>digits [1] - 618:15</p> <p>direct [8] - 364:4, 445:11, 448:10, 524:7, 604:3, 627:7, 628:1, 647:21</p> <p>DIRECT [3] - 382:21, 479:15, 608:20</p> <p>directed [3] - 352:19, 524:13, 644:6</p> <p>directly [5] - 357:7, 487:11, 581:13, 581:22, 582:9</p> <p>director [1] - 487:23</p> <p>directors [1] - 555:17</p> <p>disabled [3] - 559:4, 559:5, 559:7</p> | <p>disabling [2] - 542:22, 543:2</p> <p>disadvantage [1] - 618:13</p> <p>disadvantages [1] - 618:12</p> <p>disagree [4] - 510:3, 512:7, 665:6, 683:2</p> <p>disagreement [5] - 515:15, 515:21, 520:23, 578:10, 580:24</p> <p>disagrees [10] - 513:3, 522:6, 522:7, 528:8, 544:5, 586:14, 586:16, 586:18, 586:20, 682:22</p> <p>disaster [1] - 396:16</p> <p>disc [1] - 485:15</p> <p>discard [1] - 521:11</p> <p>discarded [1] - 497:9</p> <p>disclose [2] - 397:23, 646:24</p> <p>disclosed [9] - 350:16, 350:24, 351:4, 351:24, 359:24, 437:19, 438:2, 450:11, 647:2</p> <p>disclosure [1] - 352:1</p> <p>disclosures [1] - 360:8</p> <p>discovery [8] - 350:17, 351:15, 352:3, 352:4, 354:18, 355:1, 355:10, 360:1</p> <p>discretion [1] - 635:12</p> <p>discuss [12] - 433:1, 440:17, 446:21, 477:20, 506:15, 579:10, 597:6, 631:19, 678:15, 688:20, 688:24, 689:18</p> <p>discussed [10] - 370:19, 424:11, 437:3, 454:7, 459:6, 542:22, 543:9, 569:24, 627:16, 678:22</p> <p>discusses [2] - 453:5, 501:2</p> <p>discussing [2] - 579:2, 688:16</p> <p>discussion [12] - 362:2, 411:10, 412:8, 418:3, 426:7, 426:8, 453:14, 461:1, 514:10, 650:7, 657:13</p> | <p>685:13</p> <p>discussions [4] - 353:22, 411:1, 411:7, 424:9</p> <p>disengaged [1] - 478:2</p> <p>disk [34] - 396:6, 398:13, 398:23, 399:4, 399:21, 400:6, 405:18, 405:24, 406:17, 442:7, 443:8, 443:12, 443:15, 444:15, 484:14, 484:16, 485:6, 485:7, 485:11, 485:12, 491:21, 492:9, 492:12, 492:14, 504:14, 622:20, 625:3, 625:15, 639:23, 640:3, 656:14, 656:21, 666:11</p> <p>Disk [2] - 641:2, 641:9</p> <p>disks [18] - 367:22, 398:9, 398:11, 398:12, 398:17, 399:8, 443:7, 498:3, 498:4, 590:22, 624:24, 625:3, 625:16, 639:21, 649:8, 656:9, 656:10, 656:12</p> <p>display [2] - 437:13, 661:8</p> <p>displayed [3] - 470:16, 598:17, 641:23</p> <p>displaying [1] - 632:12</p> <p>dispute [14] - 355:23, 356:3, 481:2, 481:4, 503:16, 503:18, 520:6, 570:8, 577:19, 577:23, 578:2, 589:3, 687:14, 687:17</p> <p>disputed [4] - 504:3, 641:20, 678:19, 679:3</p> <p>disregard [1] - 417:4</p> <p>distinct [2] - 497:19, 526:12</p> <p>distinction [2] - 356:24, 357:5</p> <p>distributed [2] - 629:23, 686:23</p> <p>DISTRICT [2] - 348:1, 348:1</p> <p>District [1] - 348:15</p> <p>divided [10] - 425:24,</p> | <p>668:4, 668:9, 670:17, 672:1, 672:2, 672:4, 672:7, 678:9, 678:11</p> <p>dividing [1] - 648:15</p> <p>division [3] - 642:17, 654:4, 671:17</p> <p>Doctor [42] - 352:18, 352:20, 354:4, 430:13, 432:15, 432:21, 444:19, 445:18, 449:23, 450:21, 453:15, 466:9, 467:23, 468:13, 469:21, 470:12, 471:22, 472:16, 544:4, 548:2, 550:21, 551:4, 551:16, 554:22, 556:18, 577:19, 578:6, 579:7, 580:2, 581:11, 581:19, 582:9, 595:15, 597:2, 631:23, 633:2, 650:3, 652:14, 655:7, 655:13, 690:4, 690:8</p> <p>doctor [6] - 432:23, 439:21, 451:16, 470:23, 548:14, 690:7</p> <p>doctorate [3] - 391:21, 391:24, 392:8</p> <p>doctrine [5] - 528:11, 528:14, 529:1, 586:4, 586:6</p> <p>document [41] - 376:8, 376:18, 377:7, 377:8, 378:9, 379:11, 379:19, 384:7, 385:7, 412:20, 424:19, 424:24, 425:1, 425:5, 425:6, 426:7, 427:16, 427:17, 427:21, 427:22, 428:11, 428:16, 428:20, 436:11, 455:23, 456:10, 456:11, 457:6, 457:22, 459:6, 459:20, 459:21, 502:11, 514:16, 548:13, 548:17, 549:6, 549:10, 553:20, 627:4, 674:16</p> <p>documentation [4] - 550:6, 551:11,</p> |
|---|--|--|---|---|

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552:22, 554:12
documents [20] -
 412:11, 416:9,
 430:23, 431:7,
 431:13, 431:20,
 441:18, 442:3,
 442:4, 506:3, 548:6,
 548:9, 640:21,
 659:22, 661:4,
 667:2, 670:12,
 671:10, 674:8,
 674:12
dollar [2] - 486:4,
 618:21
dollars [3] - 402:21,
 403:16, 567:14
domain [1] - 397:23
Domain [112] - 350:20,
 351:8, 351:9,
 351:10, 351:11,
 352:14, 355:15,
 355:23, 356:10,
 356:11, 356:18,
 356:21, 357:10,
 357:13, 357:15,
 357:16, 358:8,
 368:7, 384:11,
 385:16, 385:20,
 386:19, 386:24,
 387:2, 387:7,
 387:19, 388:2,
 388:4, 389:14,
 389:17, 393:15,
 393:24, 395:10,
 397:4, 399:7,
 399:19, 400:3,
 400:8, 400:12,
 400:15, 400:18,
 401:14, 401:19,
 402:19, 403:1,
 403:5, 404:1, 404:6,
 411:20, 426:21,
 432:4, 432:8, 439:6,
 439:24, 440:6,
 440:12, 442:6,
 442:11, 442:24,
 443:5, 443:20,
 444:5, 444:7, 445:2,
 445:23, 448:11,
 457:2, 465:7,
 472:15, 472:21,
 473:7, 473:16,
 473:18, 473:21,
 474:6, 475:8, 477:9,
 477:14, 499:24,
 500:2, 500:4, 500:7,
 500:9, 500:13,
 500:17, 550:22,
 551:4, 551:8,
 551:18, 551:21,

551:22, 552:3,
 552:4, 552:10,
 552:16, 552:23,
 553:1, 553:7,
 553:20, 554:14,
 554:15, 554:23,
 555:2, 555:9,
 555:16, 556:14,
 589:12, 589:16,
 590:3, 590:18, 592:6
Domain's [14] -
 351:18, 387:21,
 403:21, 551:7,
 552:7, 552:21,
 553:10, 554:12,
 554:18, 555:3,
 556:2, 556:8, 556:9,
 556:13
DOMINGUEZ [5] -
 348:23, 372:5,
 377:3, 380:5, 381:23
done [23] - 352:6,
 393:13, 416:10,
 423:4, 460:7,
 460:17, 462:15,
 471:23, 503:2,
 503:3, 503:5, 503:9,
 538:7, 538:12,
 540:18, 548:20,
 592:2, 593:21,
 593:24, 617:4,
 624:13, 624:23,
 690:15
door [1] - 365:3
dot [2] - 428:2, 428:7
double [2] - 407:20,
 618:16
doubled [1] - 402:13
down [21] - 374:4,
 374:7, 382:2,
 385:15, 386:2,
 401:3, 401:9,
 426:13, 432:24,
 478:14, 508:3,
 508:6, 531:10,
 607:19, 625:2,
 632:19, 634:7,
 639:6, 649:24,
 662:17, 679:15
Dr [67] - 357:22, 359:3,
 359:4, 359:23,
 360:6, 364:2, 382:7,
 382:23, 383:20,
 385:7, 405:2, 417:2,
 422:5, 424:20,
 433:8, 433:10,
 434:8, 434:18,
 437:24, 438:19,
 438:21, 439:3,
 439:5, 443:16,

454:5, 454:14,
 457:17, 458:4,
 458:11, 458:16,
 459:15, 461:17,
 463:18, 464:22,
 465:10, 474:2,
 475:16, 475:21,
 477:8, 478:13,
 501:8, 502:17,
 537:20, 542:13,
 556:24, 557:4,
 557:7, 557:14,
 558:9, 558:13,
 558:15, 559:10,
 560:6, 561:24,
 563:11, 563:16,
 564:2, 568:9,
 568:21, 586:14,
 603:19, 661:13,
 665:15, 666:13,
 669:8, 691:5
draft [3] - 427:11,
 428:3, 428:5
drafts [1] - 353:7
DRAM [2] - 408:11,
 658:8
dramatically [3] -
 388:14, 398:19,
 399:3
drawing [4] - 420:4,
 420:8, 422:14, 423:3
drawings [7] - 416:10,
 416:15, 417:23,
 419:18, 421:21,
 422:1, 423:2
drew [2] - 357:5, 649:6
drive [12] - 442:8,
 443:15, 484:15,
 484:17, 485:6,
 485:11, 485:12,
 485:16, 492:9,
 492:10, 504:14,
 670:14
drives [17] - 396:6,
 398:13, 443:8,
 484:22, 485:7,
 485:14, 491:21,
 491:22, 492:7,
 492:12, 492:15,
 498:9, 620:10,
 625:21, 666:21,
 670:19, 670:21
dropped [1] - 599:9
drove [1] - 556:12
dryers [1] - 566:10
DSSD [1] - 446:11
DTX [6] - 454:19,
 570:1, 584:2,
 638:24, 639:8, 641:6
DTX-560 [2] - 450:5,

450:15
Duke [1] - 653:23
duly [4] - 382:14,
 479:7, 608:15,
 651:23
DUNN [1] - 348:21
dup [1] - 519:2
duplicate [27] -
 369:12, 388:11,
 388:16, 388:22,
 388:24, 405:8,
 408:20, 408:21,
 448:14, 454:1,
 493:2, 495:1,
 496:10, 496:14,
 496:17, 496:24,
 497:1, 501:3,
 501:11, 503:4,
 515:14, 516:20,
 516:24, 518:20,
 520:16, 521:11,
 525:7
duplicated [1] -
 622:10
duplicates [5] -
 418:24, 481:21,
 495:14, 516:11,
 516:18
duplication [2] -
 495:4, 582:8
Durick [1] - 376:18
during [25] - 351:2,
 352:3, 352:5, 360:1,
 383:16, 386:8,
 386:13, 390:4,
 390:15, 394:21,
 394:23, 394:24,
 398:3, 439:22,
 477:16, 497:3,
 582:14, 604:3,
 613:1, 617:15,
 654:13, 655:1,
 655:23, 664:5,
 687:19
DVR [2] - 395:18,
 398:21
e-mail [8] - 371:24,
 372:10, 372:11,
 372:20, 372:23,
 373:6, 373:10, 374:4
e-mails [1] - 516:22
early [8] - 397:19,
 404:15, 465:5,
 477:9, 503:2, 613:2,
 615:15, 619:1
earned [1] - 567:13
earthquake [1] -
 396:16
easel [2] - 651:19,
 652:4

easier [2] - 378:19,
 627:4
easily [1] - 359:17
east [1] - 611:13
easy [4] - 378:5,
 623:1, 623:2, 625:10
Ed [5] - 515:10, 536:7,
 536:11, 536:12,
 572:15
edits [1] - 524:8
education [2] -
 391:11, 392:10
educational [2] -
 482:8, 653:19
effect [2] - 650:17,
 651:5
effective [1] - 687:10
effectively [1] - 354:1
efficiency [2] - 659:12,
 662:7
efficient [10] - 424:8,
 499:9, 499:15,
 499:22, 500:22,
 536:17, 620:4,
 623:21, 631:10,
 658:16
efficiently [2] -
 502:21, 659:10
effort [1] - 561:23
eighteen [1] - 407:20
either [15] - 351:20,
 366:18, 401:16,
 426:23, 444:11,
 457:7, 510:22,
 538:18, 539:17,
 574:19, 584:15,
 618:8, 651:7, 680:2,
 684:8
elaborate [1] - 451:23
elaboration [1] - 452:1
elect [1] - 593:15
elected [3] - 393:9,
 393:11, 393:12
electrical [4] - 611:24,
 652:18, 686:23,
 687:3
electronic [1] - 611:20
electronically [1] -
 688:18
electronics [1] -
 485:13
element [49] - 437:18,
 460:7, 471:17,
 481:5, 481:8, 490:7,
 492:16, 504:3,
 513:2, 513:11,
 513:14, 514:5,
 523:6, 526:1,
 533:14, 543:18,
 569:5, 570:5,

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| | |
|--|--|
| 570:10, 570:13, 579:2, 579:22, 589:2, 630:16, 658:14, 660:6, 664:15, 664:19, 665:9, 666:3, 669:21, 672:17, 672:21, 675:5, 675:9, 675:10, 676:9, 677:17, 678:2, 678:5, 678:14, 679:2, 685:14, 685:18, 686:10, 686:12, 686:17, 686:18 element-by-element [1] - 460:7 elements [18] - 470:16, 471:9, 481:11, 491:6, 491:14, 491:18, 492:4, 503:19, 503:22, 504:1, 529:24, 568:23, 628:13, 663:23, 665:24, 667:5, 667:19, 686:4 elevates [1] - 650:18 eliminate [1] - 541:7 ellipses [3] - 632:20, 633:10, 633:17 email [5] - 380:13, 490:12, 493:13, 502:12 emails [3] - 493:8, 493:9, 493:11 embodied [5] - 358:9, 361:18, 504:7, 554:24, 556:2 embodies [3] - 355:24, 359:10, 359:12 embodying [1] - 356:14 EMC [78] - 348:3, 348:3, 348:4, 353:1, 354:3, 365:21, 367:20, 368:2, 368:5, 368:9, 370:20, 370:24, 371:8, 371:13, 371:15, 372:13, 372:19, 374:17, 375:6, 375:19, 376:15, 376:23, 377:21, 379:21, 402:19, 403:9, 439:16, 440:5, 440:14, 441:5, 442:2, 444:22, 445:1, 445:7, 445:22, 446:3, 446:7, 446:9, 446:20, 457:2, 457:5, 478:19, 500:9, 500:10, 500:11, 552:4, 565:20, 567:6, 567:10, 567:19, 567:22, 569:2, 589:22, 591:23, 592:2, 607:24, 609:3, 611:4, 612:7, 612:13, 613:1, 613:3, 613:11, 613:17, 616:2, 616:4, 616:6, 616:12, 616:17, 619:2, 627:9, 637:1, 637:21, 642:13, 642:16, 642:18, 642:20, 659:15 EMC's [8] - 375:21, 379:11, 380:19, 381:4, 591:16, 613:6, 639:18, 663:17 employed [2] - 483:7, 486:23 employee [3] - 493:9, 609:3, 637:1 employees [3] - 465:6, 493:10, 505:22 employment [1] - 616:21 enabled [1] - 449:7 encompass [1] - 551:22 encountering [2] - 630:3, 634:4 end [11] - 397:15, 408:22, 430:1, 477:17, 526:13, 532:7, 543:15, 626:19, 665:11, 688:4, 688:8 ended [1] - 615:16 Energy [1] - 654:6 engineer [5] - 484:3, 505:14, 612:16, 613:22, 633:10 Engineering [1] - 393:10 engineering [5] - 611:20, 611:24, 652:19, 653:1, 653:22 engineers [8] - 425:19, 487:2, 487:3, 487:4, 573:5, 633:1, 633:7, 635:14 England [1] - 483:23 English [3] - 504:9, 633:11, 634:8 enhance [1] - 614:6 enjoyed [1] - 394:18 enter [2] - 446:1, 446:6 entering [3] - 381:15, 438:13, 532:23 enterprise [4] - 485:24, 489:10, 500:16, 602:20 entire [6] - 387:23, 388:21, 409:1, 417:3, 419:2, 511:8 entirely [1] - 438:4 entirety [1] - 677:17 entitled [3] - 376:8, 377:9, 553:21 entries [1] - 597:20 entry [1] - 423:16 environment [1] - 392:13 equipment [1] - 487:22 equivalents [6] - 528:11, 528:14, 529:1, 586:4, 586:6, 587:3 erase [1] - 468:19 erroneously [1] - 495:3 error [2] - 487:8, 487:9 errors [1] - 397:9 Erta [1] - 397:5 especially [1] - 387:4 ESQ [13] - 348:19, 348:22, 348:22, 348:23, 348:23, 349:3, 349:8, 349:9, 349:11, 349:12, 349:12, 349:13, 349:13 essence [1] - 664:21 essential [4] - 544:20, 545:11, 547:13, 548:4 essentially [20] - 369:13, 420:8, 426:6, 599:10, 614:24, 615:4, 618:4, 620:20, 621:20, 628:6, 628:18, 628:24, 629:13, 630:7, 631:8, 645:16, 646:23, 665:1, 679:23, 686:19 establish [1] - 424:17, 435:8, 436:3, 568:22, 569:15, 587:3 established [3] - 466:9, 586:23, 663:22 establishes [1] - 586:11 estimated [3] - 419:11, 559:11, 600:7 estimation [1] - 562:14 evaluate [2] - 650:14, 650:15 evaluating [1] - 508:2 evaluation [1] - 571:8 evening [1] - 689:10 event [11] - 439:23, 444:6, 486:21, 508:11, 512:16, 521:19, 523:2, 524:20, 524:22, 529:6, 566:24 eventually [5] - 394:19, 418:6, 444:2, 446:8, 616:11 evidence [41] - 359:14, 359:16, 362:18, 365:21, 372:4, 377:2, 383:23, 384:24, 424:13, 430:6, 431:21, 450:15, 454:20, 467:8, 467:15, 467:16, 468:10, 468:12, 469:13, 506:8, 546:5, 546:15, 553:13, 554:5, 582:22, 609:20, 641:12, 657:24, 660:24, 663:2, 664:24, 666:5, 669:14, 670:22, 671:3, 671:6, 672:8, 674:22, 676:22, 685:3, 685:4 evoke [1] - 414:17 exact [2] - 596:19, 690:20 exactly [28] - 353:13, 356:23, 360:19, 366:13, 436:8, 454:7, 455:6, 457:21, 458:5, 458:13, 458:16, 459:1, 459:23, 467:5, 467:12, 467:20, 468:7, 468:8, 468:9, 469:11, 508:14, 525:17, 536:4, 627:17, 634:2, 665:13, 687:4 exam [1] - 640:4 EXAMINATION [8] - 380:4, 382:21, 439:1, 475:19, 479:15, 564:23, 601:22, 608:20 examination [12] - 363:17, 367:13, 376:5, 445:11, 564:12, 604:4, 636:24, 643:11, 647:21, 667:8, 683:9, 691:4 examine [2] - 603:21, 690:1 examined [6] - 382:15, 479:8, 608:16, 651:24, 659:21, 674:9 example [43] - 369:4, 369:17, 370:2, 393:5, 396:20, 407:12, 484:10, 493:4, 494:17, 496:5, 496:11, 496:20, 497:2, 501:6, 502:7, 505:1, 515:5, 519:23, 535:12, 536:23, 561:10, 572:14, 583:3, 618:3, 618:16, 620:22, 621:2, 621:11, 621:24, 629:7, 658:8, 662:12, 662:23, 666:21, 667:24, 669:6, 669:22, 672:5, 675:24, 676:1, 680:24, 683:19 examples [5] - 477:1, 477:3, 491:24, 674:17, 681:24 exceeded [1] - 400:9 except [3] - 388:17, 505:2, 558:19 excerpts [1] - 635:3 exchange [3] - 353:9, 354:2 exciting [1] - 399:15 exclude [1] - 684:3 excluded [1] - 632:19 exclusive [8] - 620:17, 625:13, 627:15, 657:1, 658:13, | |
|--|--|

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676:23, 677:21,
687:13
exclusive-or [6] -
627:15, 657:1,
658:13, 676:23,
677:21, 687:13
exclusively [1] -
624:10
excuse [7] - 358:5,
423:12, 468:13,
470:12, 470:23,
586:1, 612:15
executed [2] - 576:9,
576:11
executive [1] - 549:14
executives [3] -
371:15, 375:6,
568:14
exhibit [6] - 433:18,
433:22, 434:5,
546:8, 661:18,
666:14
Exhibit [18] - 371:21,
372:4, 376:4, 376:7,
377:2, 468:6, 506:1,
506:8, 545:20,
553:4, 553:13,
553:24, 554:5,
609:12, 609:20,
626:23, 657:20,
674:22
Exhibits [1] - 546:16
exhibits [2] - 371:22,
546:10
exist [2] - 462:12,
569:17
existed [3] - 378:9,
398:9, 649:7
existence [1] - 448:7
existing [1] - 620:9
exists [1] - 373:16
exit [1] - 526:15
expand [4] - 614:6,
626:24, 661:10,
666:10
expect [4] - 350:18,
364:3, 364:8, 414:7
expected [1] - 371:20
expecting [1] - 561:5
expensive [6] -
406:18, 408:8,
492:10, 492:11,
492:14, 625:19
experience [10] -
483:6, 486:9, 487:6,
487:11, 488:14,
630:2, 630:4, 630:6,
654:14, 655:2
experienced [2] -
602:13, 655:4

experimentally [1] -
477:14
expert [43] - 358:12,
358:19, 359:24,
360:12, 360:13,
360:16, 362:7,
362:8, 364:12,
434:10, 478:21,
488:21, 520:8,
520:24, 522:4,
526:5, 532:5,
537:19, 540:6,
541:24, 542:12,
544:4, 544:17,
546:8, 556:18,
565:3, 565:8,
565:13, 565:17,
566:1, 567:6,
567:14, 586:10,
591:11, 591:13,
600:9, 632:15,
632:22, 646:12,
650:13, 655:7,
690:14
expert's [1] - 522:14
expertise [1] - 394:13
experts [5] - 437:10,
520:11, 538:6,
565:14, 632:10
expired [1] - 440:21
explain [49] - 381:10,
386:5, 393:22,
395:8, 399:12,
401:8, 401:12,
427:8, 479:19,
489:19, 493:23,
495:23, 502:6,
504:9, 510:18,
511:3, 512:22,
513:17, 521:9,
522:24, 534:14,
534:24, 535:3,
548:13, 550:14,
560:18, 578:23,
584:11, 606:12,
621:7, 622:7,
634:24, 635:2,
653:7, 656:17,
658:1, 658:6, 659:4,
661:21, 663:13,
664:20, 666:13,
667:18, 670:9,
675:14, 679:20,
681:1, 682:13, 683:4
explained [8] - 398:8,
511:14, 656:15,
675:11, 676:11,
679:2, 683:2, 683:23
explaining [6] -
585:15, 633:3,

656:22, 658:12,
660:13, 666:17
explains [3] - 671:16,
672:13, 685:8
explanation [1] -
678:7
explicitly [3] - 354:2,
356:5, 414:21
explore [1] - 592:13
exploring [1] - 620:4
exposed [1] - 398:6
express [1] - 480:21
expressed [5] -
541:24, 585:23,
586:2, 592:14, 605:8
expressing [1] -
373:24
extend [1] - 552:2
extensive [1] - 353:5
extent [2] - 633:6,
648:20
external [1] - 659:23
extra [5] - 496:4,
497:23, 559:11,
602:7, 656:13
extremely [2] -
429:17, 615:8
eyesight [1] - 378:20
face [1] - 456:6
facilitate [2] - 629:2,
645:2
facing [2] - 550:7,
652:7
fact [35] - 351:4,
356:7, 356:23,
358:4, 358:11,
362:3, 366:7, 378:8,
409:12, 411:16,
425:16, 426:20,
435:22, 436:11,
441:12, 453:13,
469:15, 481:8,
539:15, 544:18,
558:9, 565:11,
568:12, 577:22,
591:4, 602:6, 604:3,
625:18, 632:11,
637:11, 640:2,
656:10, 663:23,
664:23, 665:23
factor [11] - 362:7,
398:14, 406:21,
406:23, 408:1,
408:5, 408:24,
410:16, 563:3
factors [3] - 361:20,
474:14, 475:14
faculty [5] - 383:7,
383:8, 392:3, 654:9,
654:11

failed [1] - 483:17
fails [1] - 498:7
Failure [2] - 641:2,
641:8
failure [2] - 483:16,
629:5
fair [6] - 439:23,
587:7, 593:19,
645:20, 652:5, 660:5
fairly [1] - 667:23
fall [1] - 586:7
familiar [8] - 368:18,
368:21, 420:16,
435:23, 450:10,
452:24, 568:18,
645:15
family [3] - 392:13,
617:10, 688:17
far [16] - 392:17,
457:5, 520:6,
538:14, 538:15,
577:6, 603:19,
617:2, 620:14,
677:8, 678:18,
678:20, 678:24,
681:7, 684:6, 689:4
fast [3] - 405:19,
498:16, 560:23
Fast [2] - 641:1, 641:8
FAST [5] - 449:15,
449:18, 450:22,
568:9
faster [4] - 492:9,
492:11, 502:16,
543:19
Faulk [1] - 566:21
fault [2] - 355:2, 579:9
Fault [1] - 641:3
Fault-Tolerant [1] -
641:3
favor [1] - 353:24
favorite [1] - 484:13
feasible [1] - 624:1
feature [13] - 370:17,
374:10, 542:21,
543:3, 549:3, 549:4,
557:19, 557:22,
587:4, 660:19,
660:22, 660:23,
661:1
features [4] - 373:14,
549:1, 550:1, 619:22
February [28] -
404:21, 404:22,
404:23, 411:5,
411:6, 411:16,
411:18, 411:22,
415:20, 417:10,
418:10, 421:10,
421:12, 421:14,

421:17, 421:19,
421:23, 455:14,
466:10, 466:13,
466:14, 467:8,
467:14, 467:21,
468:11, 469:14,
476:6, 476:8
fellow [3] - 393:11,
393:12, 455:7
felt [1] - 392:11
few [14] - 366:24,
387:16, 399:22,
407:11, 410:17,
440:16, 441:6,
460:5, 525:22,
612:5, 613:16,
635:9, 635:17,
667:17
fiber [1] - 490:4
field [6] - 373:12,
485:22, 488:21,
591:11, 610:16,
620:22
fields [2] - 566:4,
655:8
fierce(r) [2] - 379:5,
379:15
fifteen [2] - 363:18,
565:10
figure [4] - 562:10,
623:14, 623:17,
629:8
figuring [1] - 634:4
file [24] - 411:17,
418:10, 421:11,
421:12, 421:16,
421:18, 449:18,
449:22, 455:17,
461:1, 466:10,
466:14, 466:18,
466:20, 466:21,
466:22, 466:23,
466:24, 467:1,
467:2, 470:10,
470:22, 471:3,
588:23
filed [7] - 352:17,
352:24, 454:14,
454:24, 462:8,
639:19, 639:24
files [3] - 396:9,
456:13, 456:15
filing [2] - 450:12,
455:4
filter [1] - 541:12
final [1] - 541:19
finally [3] - 432:3,
628:1, 668:7
financial [4] - 365:23,
477:2, 478:8, 613:8

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| | | | | |
|---|--|---|--|---|
| <p>fine [3] - 350:4, 415:5, 688:6</p> <p>finish [7] - 451:18, 451:21, 461:17, 474:3, 689:14, 690:4, 690:24</p> <p>finishing [1] - 531:19</p> <p>finite [1] - 498:15</p> <p>fire [1] - 478:5</p> <p>fired [1] - 394:14</p> <p>firm [5] - 447:10, 475:2, 475:3, 475:7, 477:12</p> <p>firms [2] - 387:17, 475:10</p> <p>first [80] - 351:1, 352:7, 355:18, 356:9, 360:1, 370:14, 382:13, 387:10, 391:1, 391:3, 391:4, 391:6, 391:17, 391:20, 392:9, 394:8, 394:9, 396:21, 398:12, 399:11, 400:12, 400:21, 401:5, 401:19, 411:17, 427:11, 428:3, 428:5, 428:8, 430:2, 430:5, 433:18, 433:22, 434:3, 434:5, 452:21, 462:11, 462:18, 462:19, 462:21, 466:8, 479:6, 485:12, 493:21, 494:11, 495:20, 496:11, 497:21, 504:1, 510:20, 520:5, 523:12, 524:17, 524:21, 535:5, 539:1, 541:4, 551:17, 567:5, 575:13, 576:20, 576:22, 577:5, 577:14, 584:10, 608:14, 611:6, 612:6, 623:16, 626:3, 627:8, 638:16, 651:22, 655:20, 661:18, 681:17, 690:3, 690:14</p> <p>fits [1] - 588:10</p> <p>five [17] - 360:19, 371:9, 398:15, 406:23, 407:1, 408:1, 408:5, 599:2, 599:12, 599:21, 601:14, 610:14,</p> | <p>634:18, 675:18, 676:1, 676:15, 690:22</p> <p>flagship [1] - 613:6</p> <p>Flash [55] - 351:12, 367:22, 368:10, 368:13, 372:12, 375:4, 377:14, 377:17, 377:22, 442:20, 443:12, 443:15, 443:21, 443:23, 444:2, 444:8, 444:11, 445:8, 446:1, 446:6, 446:12, 446:17, 463:15, 491:23, 492:10, 492:15, 497:18, 498:2, 498:6, 504:14, 590:19, 591:1, 591:16, 592:3, 592:8, 592:11, 592:12, 643:24, 644:2, 644:7, 644:10, 644:13, 654:23, 658:9, 662:5, 662:14, 666:2, 666:11, 666:19, 666:20, 666:23, 667:3, 668:3, 681:23</p> <p>FlashArray [48] - 371:19, 376:8, 506:2, 506:15, 513:7, 529:14, 530:8, 549:1, 557:9, 557:11, 557:18, 558:8, 559:20, 562:17, 564:4, 570:17, 596:3, 602:12, 602:19, 660:4, 660:9, 660:20, 661:2, 663:12, 664:11, 665:20, 666:7, 666:15, 666:18, 667:9, 670:3, 671:4, 671:22, 672:21, 674:14, 675:8, 678:4, 679:7, 680:5, 684:16, 685:19, 686:6, 686:8, 687:7, 687:9, 687:16</p> <p>FlashArrays [5] - 557:24, 558:13, 558:16, 558:17, 558:23</p> <p>flawed [1] - 560:14</p> <p>flexibility [2] - 658:24, 659:11</p> | <p>flip [3] - 384:21, 423:8, 424:20</p> <p>flipped [2] - 433:16, 434:3</p> <p>flipping [1] - 433:21</p> <p>flow [1] - 603:18</p> <p>flowing [1] - 490:21</p> <p>focus [9] - 429:4, 442:10, 442:12, 574:12, 614:4, 614:7, 614:9, 660:6, 664:14</p> <p>focused [2] - 398:10, 660:19</p> <p>focusing [2] - 387:5, 612:16</p> <p>fold [2] - 500:9, 642:13</p> <p>folks [2] - 380:14, 381:6</p> <p>follow [6] - 387:19, 400:11, 414:15, 417:13, 426:6, 561:23</p> <p>follow-up [2] - 400:11, 417:13</p> <p>followed [1] - 687:22</p> <p>following [3] - 403:20, 418:21, 448:3</p> <p>follows [4] - 382:15, 479:8, 608:16, 652:1</p> <p>footprint [4] - 388:13, 398:22, 399:4, 406:19</p> <p>FOR [1] - 348:1</p> <p>foregoing [1] - 692:9</p> <p>forewent [1] - 353:11</p> <p>form [2] - 513:22, 527:11</p> <p>formal [1] - 447:7</p> <p>formed [3] - 393:24, 588:6, 677:9</p> <p>forming [2] - 553:20, 573:9</p> <p>forms [3] - 375:20, 444:18, 448:19</p> <p>formula [1] - 407:8</p> <p>forth [6] - 353:7, 429:20, 580:24, 613:8, 626:2, 638:23</p> <p>forty [3] - 364:5, 565:8, 690:22</p> <p>forty-five [1] - 690:22</p> <p>forward [6] - 367:4, 533:22, 537:16, 549:21, 561:2, 612:5</p> <p>forwarding [1] - 372:19</p> <p>forwards [1] - 375:5</p> | <p>445:10</p> <p>founded [4] - 487:13, 487:14, 487:20, 487:21</p> <p>founder [5] - 407:18, 410:24, 439:24, 477:21, 477:22</p> <p>founders [6] - 393:20, 393:23, 394:1, 394:7, 395:9, 404:16</p> <p>founding [1] - 393:15</p> <p>four [9] - 407:12, 407:13, 408:3, 436:11, 540:14, 567:9, 567:22, 668:5, 676:18</p> <p>four [1] - 684:13</p> <p>fourteen [2] - 399:17, 404:14</p> <p>fourth [1] - 662:17</p> <p>frame [3] - 417:10, 431:16, 472:7</p> <p>Frank [6] - 353:1, 353:10, 353:23, 354:1, 555:12, 555:15</p> <p>frank [1] - 556:7</p> <p>frequently [4] - 526:14, 557:8, 565:3, 565:5</p> <p>friend [1] - 394:5</p> <p>friends [2] - 386:14, 688:18</p> <p>front [4] - 378:18, 433:23, 627:5, 657:17</p> <p>FRY [1] - 349:9</p> <p>Fujitsu [2] - 486:13</p> <p>full [10] - 370:14, 383:1, 392:4, 396:10, 479:1, 503:10, 598:1, 608:9, 633:6, 685:12</p> <p>function [17] - 375:23, 423:14, 519:11, 520:1, 526:15, 528:17, 529:4, 580:7, 585:2, 587:4, 587:6, 587:8, 588:15, 604:5, 604:14, 604:22, 605:2</p> <p>functional [3] - 425:18, 426:2, 431:11</p> <p>functionality [2] - 587:15, 633:2</p> <p>functions [5] - 519:1, 526:14, 575:20, 604:24, 659:22</p> | <p>funding [1] - 477:10</p> <p>future [4] - 423:14, 486:6, 561:8, 563:4</p> <p>GA [2] - 374:4, 374:8</p> <p>gain [1] - 478:8</p> <p>gains [2] - 374:11, 477:2</p> <p>game [3] - 351:24, 566:15, 566:16</p> <p>gathering [1] - 361:11</p> <p>gear [2] - 515:2, 525:1</p> <p>general [11] - 356:18, 374:5, 509:16, 592:10, 610:12, 610:13, 615:9, 615:14, 645:18, 648:13, 670:12</p> <p>generally [15] - 368:21, 370:15, 371:4, 371:10, 371:14, 373:7, 511:6, 519:19, 561:2, 567:19, 627:12, 640:14, 660:22, 662:13, 663:15</p> <p>generate [2] - 620:18, 676:24</p> <p>generated [1] - 403:6</p> <p>generating [1] - 535:15</p> <p>generation [3] - 614:7, 619:6, 619:18</p> <p>generations [1] - 484:7</p> <p>geometry [1] - 548:18</p> <p>Georgia [2] - 361:20, 362:6</p> <p>Georgia-Pacific [2] - 361:20, 362:6</p> <p>GIBSON [1] - 348:21</p> <p>given [15] - 351:3, 352:8, 362:4, 415:11, 437:21, 478:7, 508:4, 508:15, 508:20, 549:21, 559:6, 569:8, 569:11, 596:9, 629:7</p> <p>glad [1] - 616:18</p> <p>global [6] - 387:15, 388:19, 419:3, 425:22, 473:12, 550:18</p> <p>goal [1] - 628:15</p> <p>Goldstein [5] - 372:20, 372:24, 373:6, 374:16, 690:13</p> <p>Goldstein's [1] - 375:5</p> |
|---|--|---|--|---|

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| | | | | |
|--|--|--|--|--|
| <p>goldstein's [1] - 372:23</p> <p>Goliath [1] - 366:7</p> <p>Google [2] - 394:7, 689:2</p> <p>Gordon [1] - 407:18</p> <p>government [4] - 391:17, 483:8, 483:13, 483:19</p> <p>graduate [4] - 394:3, 612:6, 654:17, 654:20</p> <p>graduated [1] - 391:24</p> <p>graduates [1] - 654:19</p> <p>grandfather [2] - 485:16, 485:17</p> <p>graphic [4] - 379:21, 491:4, 582:17, 582:20</p> <p>graphics [1] - 572:9</p> <p>great [7] - 396:1, 440:9, 485:16, 616:18, 617:5, 617:7, 619:21</p> <p>greater [1] - 407:1</p> <p>green [2] - 658:19, 668:1</p> <p>grew [3] - 363:19, 389:24, 390:8</p> <p>Greylock [8] - 447:4, 447:5, 447:10, 447:12, 447:19, 447:21, 447:22, 447:24</p> <p>grids [1] - 672:3</p> <p>gross [4] - 403:7, 403:14, 403:15, 403:19</p> <p>Group [6] - 372:12, 375:4, 376:2, 376:23, 377:21, 378:3</p> <p>group [14] - 375:19, 437:3, 616:14, 673:17, 673:20, 675:18, 675:23, 676:6, 676:13, 677:9, 677:10, 677:12, 686:20, 687:2</p> <p>grouped [3] - 672:20, 672:23, 677:11</p> <p>grouping [1] - 673:18</p> <p>groups [12] - 672:20, 672:24, 673:9, 673:14, 673:15, 673:22, 673:24, 674:2, 675:5, 675:16, 675:20</p> <p>grow [1] - 389:23</p> | <p>growing [1] - 407:16</p> <p>grows [1] - 408:1</p> <p>growth [3] - 407:15, 407:17, 407:22</p> <p>guess [4] - 361:17, 435:19, 436:14, 459:24</p> <p>guessed [2] - 468:22, 469:4</p> <p>guide [7] - 506:2, 506:15, 666:7, 666:24, 667:1, 674:15, 674:19</p> <p>guides [1] - 506:5</p> <p>Guilds [3] - 482:11, 482:17, 482:20</p> <p>guy [3] - 366:6, 366:16, 651:11</p> <p>half [5] - 359:9, 484:19, 559:21, 562:11, 595:16</p> <p>hand [12] - 359:17, 379:3, 419:8, 494:3, 500:5, 518:12, 518:14, 602:1, 634:13, 667:24, 676:20, 692:15</p> <p>handed [2] - 579:13, 609:10</p> <p>handle [4] - 366:18, 491:13, 498:16, 560:24</p> <p>handling [2] - 495:12, 608:2</p> <p>hands [2] - 353:16, 487:6</p> <p>handwriting [3] - 423:17, 423:19, 462:24</p> <p>happy [4] - 359:13, 364:21, 365:12, 365:15</p> <p>hard [15] - 367:22, 418:13, 429:16, 429:19, 429:23, 431:17, 492:9, 492:12, 492:14, 594:5, 620:10, 625:3, 634:10, 659:23, 666:21</p> <p>hardware [5] - 373:3, 485:23, 612:16, 613:22, 628:21</p> <p>hash [13] - 419:3, 519:12, 519:13, 519:15, 519:17, 519:20, 519:21, 520:2, 539:2, 539:7, 539:8, 541:11, 605:1</p> <p>Hawkins [3] - 692:7</p> | <p>692:19, 692:20</p> <p>head [7] - 372:10, 372:12, 373:20, 374:16, 374:21, 375:3, 636:8</p> <p>heads [2] - 374:4, 374:7</p> <p>hear [9] - 361:21, 365:8, 438:7, 486:18, 551:17, 652:22, 664:8, 687:17</p> <p>heard [22] - 386:4, 436:12, 481:19, 486:19, 500:12, 500:17, 528:10, 551:16, 568:9, 570:4, 620:13, 640:8, 640:13, 656:3, 658:5, 662:20, 664:14, 666:21, 678:17, 678:23, 684:4, 689:4</p> <p>hearing [2] - 624:16, 653:9</p> <p>hearsay [2] - 632:10, 635:11</p> <p>heat [4] - 532:21, 533:3, 561:11, 631:13</p> <p>heating [1] - 561:13</p> <p>held [2] - 484:21, 485:3</p> <p>hello [1] - 572:14</p> <p>help [11] - 365:13, 386:15, 486:5, 487:3, 489:4, 513:18, 534:14, 534:24, 565:16, 650:14, 650:15</p> <p>helpful [1] - 633:17</p> <p>hereby [1] - 692:9</p> <p>herein [4] - 382:13, 479:6, 608:14, 651:22</p> <p>hereunto [1] - 692:14</p> <p>HERRINGTON [1] - 349:3</p> <p>hesitate [1] - 478:2</p> <p>hid [1] - 626:17</p> <p>high [11] - 388:7, 406:4, 407:2, 407:16, 419:6, 500:19, 541:10, 615:7, 660:3, 663:10, 679:22</p> <p>higher [1] - 406:20</p> <p>highest [3] - 406:9, 596:11, 599:2</p> <p>highlight [3] - 384:6</p> | <p>453:24, 454:22</p> <p>highlighted [7] - 501:7, 599:6, 639:13, 658:10, 658:19, 658:23, 670:18</p> <p>highlighting [1] - 494:10</p> <p>highlights [1] - 673:20</p> <p>highly [3] - 356:6, 434:9, 436:12</p> <p>hired [2] - 612:14, 612:15</p> <p>hiring [1] - 487:3</p> <p>historically [1] - 491:20</p> <p>hit [2] - 562:6, 655:18</p> <p>hoc [1] - 353:21</p> <p>hold [3] - 408:11, 433:24, 497:23</p> <p>Holland [2] - 641:1, 641:8</p> <p>home [3] - 566:7, 566:12, 654:11</p> <p>honesty [2] - 476:15, 476:23</p> <p>Honor [138] - 350:4, 352:12, 353:4, 353:9, 353:21, 353:24, 356:13, 356:22, 357:20, 358:6, 359:3, 359:23, 360:6, 360:14, 360:22, 361:5, 361:7, 362:3, 362:20, 362:22, 363:2, 363:6, 363:10, 363:15, 364:10, 364:18, 365:4, 365:16, 365:19, 365:24, 366:11, 366:14, 367:7, 367:15, 382:4, 382:6, 382:17, 383:22, 384:23, 385:4, 412:1, 413:24, 414:24, 419:22, 424:12, 424:15, 430:5, 430:9, 431:19, 431:23, 432:16, 433:4, 433:12, 433:15, 435:10, 436:7, 437:17, 438:10, 438:21, 445:10, 445:14, 450:15, 450:17, 451:17, 453:4, 453:7, 454:6, 454:12, 454:20,</p> | <p>457:23, 465:8, 474:1, 478:12, 478:17, 478:19, 479:9, 488:19, 488:23, 506:7, 506:10, 508:10, 508:24, 525:10, 531:15, 531:17, 532:14, 533:9, 544:17, 544:19, 546:4, 546:7, 546:13, 546:18, 553:12, 553:15, 554:4, 554:7, 564:14, 564:16, 564:21, 582:24, 601:18, 601:21, 604:9, 604:18, 607:21, 607:23, 608:17, 609:19, 631:21, 632:5, 632:24, 635:19, 636:1, 636:18, 641:13, 641:22, 643:4, 643:9, 646:11, 647:7, 647:11, 647:19, 649:3, 649:11, 650:2, 651:17, 651:18, 652:6, 655:6, 661:7, 663:1, 674:21, 689:20, 689:21, 690:12, 691:3, 691:12</p> <p>HONORABLE [1] - 348:14</p> <p>honors [2] - 393:2, 393:6</p> <p>hopefully [1] - 363:21</p> <p>hoping [2] - 481:15, 489:4</p> <p>host [4] - 366:17, 489:24, 490:9, 490:16</p> <p>hosts [3] - 489:21, 494:3, 535:15</p> <p>hour [8] - 359:9, 404:14, 441:18, 458:14, 531:4, 532:10, 653:13, 690:21</p> <p>hours [7] - 399:17, 407:11, 407:13, 408:3, 429:24, 599:13, 599:16</p> <p>house [2] - 464:19, 561:11</p> <p>huge [2] - 378:4, 490:24</p> <p>Hugo [2] - 411:19,</p> |
|--|--|--|--|--|

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| | | |
|---|--|---|
| <p>465:6 human [3] - 397:9, 469:9, 476:17 hundred [7] - 388:18, 400:23, 403:16, 465:24, 466:5, 503:3, 567:14 hundreds [1] - 619:13 hurry [1] - 367:4 hurting [1] - 626:21 Hussein [8] - 372:1, 372:9, 372:11, 372:18, 375:3, 375:10, 375:13, 375:17 Hussein's [1] - 372:15 hybrid [3] - 367:24, 368:1, 368:2 Hyrahan [1] - 394:4 Ian [5] - 360:17, 478:20, 479:2, 479:21, 487:18 IAN [3] - 479:3, 479:5, 487:17 IBM [10] - 483:20, 483:21, 483:22, 484:1, 484:6, 484:8, 485:19, 486:8, 486:11, 560:11 idea [13] - 399:23, 404:17, 428:16, 434:16, 448:11, 483:14, 502:14, 502:20, 620:6, 620:8, 620:16, 623:10, 623:23 ideas [14] - 404:19, 410:18, 410:22, 411:3, 416:7, 417:19, 420:5, 420:10, 426:7, 426:10, 426:23, 455:8, 476:5, 658:20 identified [15] - 360:7, 388:16, 421:7, 453:20, 581:13, 582:9, 584:5, 587:16, 587:24, 604:24, 605:11, 607:8, 667:20, 669:23, 684:18 identifier [81] - 507:7, 509:8, 512:16, 514:22, 515:4, 515:10, 515:12, 515:18, 515:20, 515:23, 517:7, 517:11, 518:1, 518:6, 518:7, 519:8, 519:18, 519:22,</p> | <p>520:19, 521:2, 521:18, 521:22, 522:2, 522:10, 522:12, 523:2, 523:7, 524:17, 525:4, 525:19, 526:1, 527:4, 527:9, 527:10, 527:18, 527:21, 527:24, 528:2, 528:4, 528:24, 529:7, 529:13, 529:18, 535:24, 536:6, 536:10, 537:1, 537:12, 537:13, 571:5, 571:16, 571:20, 572:14, 573:12, 573:20, 574:8, 576:15, 576:19, 581:14, 581:23, 582:10, 583:18, 583:21, 583:23, 584:22, 587:12, 588:1, 588:4, 603:12, 604:7, 604:16, 604:23, 605:2, 605:17, 606:3, 606:5, 606:19, 606:22, 607:1, 607:5 identifiers [8] - 510:11, 516:9, 516:12, 516:15, 517:19, 518:4, 526:24, 541:13 identifies [3] - 509:9, 537:14, 684:17 identify [17] - 388:11, 405:8, 408:15, 418:22, 418:23, 437:10, 437:13, 452:10, 493:12, 561:19, 562:3, 579:18, 583:6, 604:4, 604:13, 607:3, 680:23 identifying [4] - 410:1, 481:20, 493:1, 588:18 IEEE [2] - 393:11 Il [1] - 390:4 Illinois [1] - 390:11 illustrate [2] - 542:10, 656:5 illustrated [1] - 668:5 illustrates [2] - 656:17, 667:22 illustration [4] - 489:22, 535:13, 536:3, 536:9</p> | <p>image [1] - 639:1 imagine [4] - 353:6, 355:5, 618:19, 619:11 immediately [2] - 411:14, 429:6 immigrants [1] - 392:10 Immigration [1] - 483:2 impact [1] - 378:4 impeachment [1] - 457:24 implement [6] - 406:2, 422:9, 425:20, 426:3, 551:12 implementation [1] - 454:3 implementations [2] - 378:4, 378:11 implemented [1] - 556:15 implementing [4] - 426:24, 499:1, 628:4, 628:16 implications [3] - 631:1, 631:4, 631:7 imply [1] - 574:7 important [17] - 356:23, 388:1, 418:3, 464:21, 464:24, 465:5, 473:2, 473:9, 473:15, 475:12, 476:16, 477:18, 555:9, 556:3, 559:9, 603:19, 661:1 improper [4] - 350:23, 434:9, 632:17, 632:22 improve [1] - 614:5 IN [2] - 348:1, 692:14 inadmissible [1] - 650:11 INC [1] - 348:7 inclined [1] - 635:10 include [7] - 486:17, 504:19, 507:1, 552:6, 667:12, 677:12, 679:10 included [3] - 508:9, 628:8, 677:7 includes [6] - 504:19, 671:7, 675:6, 679:7, 686:14, 687:1 including [7] - 354:4, 356:6, 481:8, 506:18, 627:1, 628:14, 654:21 inclusive [4] - 603:10, 603:11, 603:12, 603:13, 603:14, 603:15, 603:16, 603:17, 603:18, 603:19, 603:20, 603:21, 603:22, 603:23, 603:24, 603:25, 603:26, 603:27, 603:28, 603:29, 603:30, 603:31, 603:32, 603:33, 603:34, 603:35, 603:36, 603:37, 603:38, 603:39, 603:40, 603:41, 603:42, 603:43, 603:44, 603:45, 603:46, 603:47, 603:48, 603:49, 603:50, 603:51, 603:52, 603:53, 603:54, 603:55, 603:56, 603:57, 603:58, 603:59, 603:60, 603:61, 603:62, 603:63, 603:64, 603:65, 603:66, 603:67, 603:68, 603:69, 603:70, 603:71, 603:72, 603:73, 603:74, 603:75, 603:76, 603:77, 603:78, 603:79, 603:80, 603:81, 603:82, 603:83, 603:84, 603:85, 603:86, 603:87, 603:88, 603:89, 603:90, 603:91, 603:92, 603:93, 603:94, 603:95, 603:96, 603:97, 603:98, 603:99, 603:100, 603:101, 603:102, 603:103, 603:104, 603:105, 603:106, 603:107, 603:108, 603:109, 603:110, 603:111, 603:112, 603:113, 603:114, 603:115, 603:116, 603:117, 603:118, 603:119, 603:120, 603:121, 603:122, 603:123, 603:124, 603:125, 603:126, 603:127, 603:128, 603:129, 603:130, 603:131, 603:132, 603:133, 603:134, 603:135, 603:136, 603:137, 603:138, 603:139, 603:140, 603:141, 603:142, 603:143, 603:144, 603:145, 603:146, 603:147, 603:148, 603:149, 603:150, 603:151, 603:152, 603:153, 603:154, 603:155, 603:156, 603:157, 603:158, 603:159, 603:160, 603:161, 603:162, 603:163, 603:164, 603:165, 603:166, 603:167, 603:168, 603:169, 603:170, 603:171, 603:172, 603:173, 603:174, 603:175, 603:176, 603:177, 603:178, 603:179, 603:180, 603:181, 603:182, 603:183, 603:184, 603:185, 603:186, 603:187, 603:188, 603:189, 603:190, 603:191, 603:192, 603:193, 603:194, 603:195, 603:196, 603:197, 603:198, 603:199, 603:200, 603:201, 603:202, 603:203, 603:204, 603:205, 603:206, 603:207, 603:208, 603:209, 603:210, 603:211, 603:212, 603:213, 603:214, 603:215, 603:216, 603:217, 603:218, 603:219, 603:220, 603:221, 603:222, 603:223, 603:224, 603:225, 603:226, 603:227, 603:228, 603:229, 603:230, 603:231, 603:232, 603:233, 603:234, 603:235, 603:236, 603:237, 603:238, 603:239, 603:240, 603:241, 603:242, 603:243, 603:244, 603:245, 603:246, 603:247, 603:248, 603:249, 603:250, 603:251, 603:252, 603:253, 603:254, 603:255, 603:256, 603:257, 603:258, 603:259, 603:260, 603:261, 603:262, 603:263, 603:264, 603:265, 603:266, 603:267, 603:268, 603:269, 603:270, 603:271, 603:272, 603:273, 603:274, 603:275, 603:276, 603:277, 603:278, 603:279, 603:280, 603:281, 603:282, 603:283, 603:284, 603:285, 603:286, 603:287, 603:288, 603:289, 603:290, 603:291, 603:292, 603:293, 603:294, 603:295, 603:296, 603:297, 603:298, 603:299, 603:300, 603:301, 603:302, 603:303, 603:304, 603:305, 603:306, 603:307, 603:308, 603:309, 603:310, 603:311, 603:312, 603:313, 603:314, 603:315, 603:316, 603:317, 603:318, 603:319, 603:320, 603:321, 603:322, 603:323, 603:324, 603:325, 603:326, 603:327, 603:328, 603:329, 603:330, 603:331, 603:332, 603:333, 603:334, 603:335, 603:336, 603:337, 603:338, 603:339, 603:340, 603:341, 603:342, 603:343, 603:344, 603:345, 603:346, 603:347, 603:348, 603:349, 603:350, 603:351, 603:352, 603:353, 603:354, 603:355, 603:356, 603:357, 603:358, 603:359, 603:360, 603:361, 603:362, 603:363, 603:364, 603:365, 603:366, 603:367, 603:368, 603:369, 603:370, 603:371, 603:372, 603:373, 603:374, 603:375, 603:376, 603:377, 603:378, 603:379, 603:380, 603:381, 603:382, 603:383, 603:384, 603:385, 603:386, 603:387, 603:388, 603:389, 603:390, 603:391, 603:392, 603:393, 603:394, 603:395, 603:396, 603:397, 603:398, 603:399, 603:400, 603:401, 603:402, 603:403, 603:404, 603:405, 603:406, 603:407, 603:408, 603:409, 603:410, 603:411, 603:412, 603:413, 603:414, 603:415, 603:416, 603:417, 603:418, 603:419, 603:420, 603:421, 603:422, 603:423, 603:424, 603:425, 603:426, 603:427, 603:428, 603:429, 603:430, 603:431, 603:432, 603:433, 603:434, 603:435, 603:436, 603:437, 603:438, 603:439, 603:440, 603:441, 603:442, 603:443, 603:444, 603:445, 603:446, 603:447, 603:448, 603:449, 603:450, 603:451, 603:452, 603:453, 603:454, 603:455, 603:456, 603:457, 603:458, 603:459, 603:460, 603:461, 603:462, 603:463, 603:464, 603:465, 603:466, 603:467, 603:468, 603:469, 603:470, 603:471, 603:472, 603:473, 603:474, 603:475, 603:476, 603:477, 603:478, 603:479, 603:480, 603:481, 603:482, 603:483, 603:484, 603:485, 603:486, 603:487, 603:488, 603:489, 603:490, 603:491, 603:492, 603:493, 603:494, 603:495, 603:496, 603:497, 603:498, 603:499, 603:500, 603:501, 603:502, 603:503, 603:504, 603:505, 603:506, 603:507, 603:508, 603:509, 603:510, 603:511, 603:512, 603:513, 603:514, 603:515, 603:516, 603:517, 603:518, 603:519, 603:520, 603:521, 603:522, 603:523, 603:524, 603:525, 603:526, 603:527, 603:528, 603:529, 603:530, 603:531, 603:532, 603:533, 603:534, 603:535, 603:536, 603:537, 603:538, 603:539, 603:540, 603:541, 603:542, 603:543, 603:544, 603:545, 603:546, 603:547, 603:548, 603:549, 603:550, 603:551, 603:552, 603:553, 603:554, 603:555, 603:556, 603:557, 603:558, 603:559, 603:560, 603:561, 603:562, 603:563, 603:564, 603:565, 603:566, 603:567, 603:568, 603:569, 603:570, 603:571, 603:572, 603:573, 603:574, 603:575, 603:576, 603:577, 603:578, 603:579, 603:580, 603:581, 603:582, 603:583, 603:584, 603:585, 603:586, 603:587, 603:588, 603:589, 603:590, 603:591, 603:592, 603:593, 603:594, 603:595, 603:596, 603:597, 603:598, 603:599, 603:600, 603:601, 603:602, 603:603, 603:604, 603:605, 603:606, 603:607, 603:608, 603:609, 603:610, 603:611, 603:612, 603:613, 603:614, 603:615, 603:616, 603:617, 603:618, 603:619, 603:620, 603:621, 603:622, 603:623, 603:624, 603:625, 603:626, 603:627, 603:628, 603:629, 603:630, 603:631, 603:632, 603:633, 603:634, 603:635, 603:636, 603:637, 603:638, 603:639, 603:640, 603:641, 603:642, 603:643, 603:644, 603:645, 603:646, 603:647, 603:648, 603:649, 603:650, 603:651, 603:652, 603:653, 603:654, 603:655, 603:656, 603:657, 603:658, 603:659, 603:660, 603:661, 603:662, 603:663, 603:664, 603:665, 603:666, 603:667, 603:668, 603:669, 603:670, 603:671, 603:672, 603:673, 603:674, 603:675, 603:676, 603:677, 603:678, 603:679, 603:680, 603:681, 603:682, 603:683, 603:684, 603:685, 603:686, 603:687, 603:688, 603:689, 603:690, 603:691, 603:692, 603:693, 603:694, 603:695, 603:696, 603:697, 603:698, 603:699, 603:700, 603:701, 603:702, 603:703, 603:704, 603:705, 603:706, 603:707, 603:708, 603:709, 603:710, 603:711, 603:712, 603:713, 603:714, 603:715, 603:716, 603:717, 603:718, 603:719, 603:720, 603:721, 603:722, 603:723, 603:724, 603:725, 603:726, 603:727, 603:728, 603:729, 603:730, 603:731, 603:732, 603:733, 603:734, 603:735, 603:736, 603:737, 603:738, 603:739, 603:740, 603:741, 603:742, 603:743, 603:744, 603:745, 603:746, 603:747, 603:748, 603:749, 603:750, 603:751, 603:752, 603:753, 603:754, 603:755, 603:756, 603:757, 603:758, 603:759, 603:760, 603:761, 603:762, 603:763, 603:764, 603:765, 603:766, 603:767, 603:768, 603:769, 603:770, 603:771, 603:772, 603:773, 603:774, 603:775, 603:776, 603:777, 603:778, 603:779, 603:780, 603:781, 603:782, 603:783, 603:784, 603:785, 603:786, 603:787, 603:788, 603:789, 603:790, 603:791, 603:792, 603:793, 603:794, 603:795, 603:796, 603:797, 603:798, 603:799, 603:800, 603:801, 603:802, 603:803, 603:804, 603:805, 603:806, 603:807, 603:808, 603:809, 603:810, 603:811, 603:812, 603:813, 603:814, 603:815, 603:816, 603:817, 603:818, 603:819, 603:820, 603:821, 603:822, 603:823, 603:824, 603:825, 603:826, 603:827, 603:828, 603:829, 603:830, 603:831, 603:832, 603:833, 603:834, 603:835, 603:836, 603:837, 603:838, 603:839, 603:840, 603:841, 603:842, 603:843, 603:844, 603:845, 603:846, 603:847, 603:848, 603:849, 603:850, 603:851, 603:852, 603:853, 603:854, 603:855, 603:856, 603:857, 603:858, 603:859, 603:860, 603:861, 603:862, 603:863, 603:864, 603:865, 603:866, 603:867, 603:868, 603:869, 603:870, 603:871, 603:872, 603:873, 603:874, 603:875, 603:876, 603:877, 603:878, 603:879, 603:880, 603:881, 603:882, 603:883, 603:884, 603:885, 603:886, 603:887, 603:888, 603:889, 603:890, 603:891, 603:892, 603:893, 603:894, 603:895, 603:896, 603:897, 603:898, 603:899, 603:900, 603:901, 603:902, 603:903, 603:904, 603:905, 603:906, 603:907, 603:908, 603:909, 603:910, 603:911, 603:912, 603:913, 603:914, 603:915, 603:916, 603:917, 603:918, 603:919, 603:920, 603:921, 603:922, 603:923, 603:924, 603:925, 603:926, 603:9</p> |
|---|--|---|

586:12, 589:1,
589:5, 593:7, 603:9,
603:23, 607:12,
653:8, 657:15,
660:19
infringes [15] -
479:24, 480:10,
503:17, 503:24,
524:5, 528:24,
530:7, 552:18,
576:15, 587:18,
587:20, 588:24,
660:13, 663:12,
686:8
infringing [11] -
537:22, 540:7,
542:2, 585:1,
593:10, 593:14,
593:16, 593:18,
593:20, 595:3, 595:4
inherently [1] - 625:16
initial [4] - 360:7,
377:15, 379:13,
379:17
inline [88] - 493:20,
495:22, 496:2,
496:13, 497:13,
497:14, 498:11,
498:14, 498:21,
499:1, 499:9,
500:23, 503:3,
513:22, 514:1,
514:19, 516:1,
517:4, 520:14,
521:16, 537:22,
538:7, 538:13,
538:19, 539:16,
540:7, 540:15,
540:23, 540:24,
542:16, 542:18,
542:20, 543:2,
543:5, 543:10,
543:13, 543:16,
543:22, 544:10,
545:7, 545:11,
545:15, 547:5,
547:16, 547:19,
547:23, 548:4,
548:19, 548:20,
549:3, 549:11,
549:24, 550:9,
550:15, 550:18,
555:8, 555:24,
556:19, 557:2,
557:6, 557:8,
557:15, 557:19,
557:22, 557:24,
558:2, 558:6,
558:10, 558:18,
558:23, 559:1,

559:8, 559:13,
559:19, 563:18,
564:3, 592:23,
593:3, 593:11,
593:23, 594:4,
594:6, 594:9,
594:11, 594:24,
595:7, 603:3
innovation [1] -
389:13
innovations [3] -
389:9, 389:12
innovative [2] - 617:6
insanely [4] - 377:22,
379:4, 379:14,
379:21
inside [5] - 407:6,
491:3, 491:15,
496:21, 658:21
inspect [1] - 450:23
instance [1] - 675:21
instances [2] - 602:5,
687:20
instead [1] - 594:19
Institute [3] - 482:12,
482:18, 482:20
institution [1] - 613:7
institutions [1] - 613:8
instruct [1] - 413:15
instruction [6] -
413:24, 414:11,
504:16, 526:8,
526:10, 688:16
instructions [5] -
504:8, 504:15,
504:20, 505:13,
652:9
integer [1] - 675:7
integral [1] - 654:23
integrated [1] - 612:20
integrity [6] - 476:16,
476:19, 476:23,
477:2, 477:4, 478:7
Intel [1] - 407:18
intelligence [1] -
379:12
Intelligence [4] -
376:2, 376:23,
377:20, 378:3
intend [1] - 632:7
intended [2] - 575:5,
575:9
intending [4] - 415:2,
436:21, 436:22,
575:11
interest [2] - 395:5,
615:24
interested [4] -
386:14, 416:3,
417:14, 616:1

interesting [1] -
429:21
interface [2] - 490:4,
535:16
internal [1] - 659:22
internally [3] - 387:14,
442:19, 682:8
INTERNATIONAL [2] -
348:3, 348:4
interphase [2] -
490:23, 494:5
interpretation [3] -
578:9, 586:15,
687:22
interpretations [1] -
687:24
interpreted [1] -
687:21
introduce [4] - 383:2,
383:23, 609:1,
652:15
introduced [5] -
367:21, 368:10,
384:24, 400:19,
477:12
introducing [2] -
365:21, 626:1
invalidity [2] - 437:20,
508:3
invent [9] - 405:2,
406:2, 448:11,
474:16, 638:11,
640:2, 640:6,
644:18, 648:2
invented [7] - 405:14,
555:8, 622:18,
622:23, 629:18,
638:13, 642:2
invention [38] -
350:21, 351:6,
356:15, 404:19,
406:7, 420:7, 421:8,
422:9, 426:18,
426:19, 429:7,
429:16, 435:6,
436:24, 448:23,
449:10, 500:20,
556:8, 556:9, 609:9,
610:22, 613:15,
617:16, 629:21,
630:4, 630:24,
631:1, 639:10,
639:15, 647:13,
649:7, 658:2, 659:6,
659:7, 659:15,
659:18, 665:16
inventions [13] -
406:6, 409:5, 417:9,
417:24, 418:6,
419:19, 422:13,

423:11, 425:10,
425:11, 426:15,
428:22, 429:2
inventor [9] - 350:15,
392:18, 411:20,
435:5, 461:4,
471:20, 531:23,
609:15, 610:5
inventors [14] - 382:8,
385:13, 435:16,
452:19, 455:7,
609:7, 610:2, 610:8,
617:16, 620:7,
622:17, 623:10,
630:24, 637:4
invest [1] - 447:21
invested [2] - 447:4,
447:18
investing [1] - 447:22
investment [1] -
447:13
investments [2] -
447:16, 447:24
investor [2] - 394:9,
447:2
involve [1] - 682:13
involved [7] - 490:14,
500:13, 584:24,
585:6, 604:6, 607:4,
654:20
involves [2] - 572:1,
572:3
IO [1] - 371:13
IPO [1] - 365:22
iPod [1] - 398:21
ipods [1] - 395:17
Ireland [2] - 611:9,
611:18
irrelevant [3] - 436:13,
438:4, 646:13
irresistible [1] - 377:9
Irvine [1] - 616:16
issue [31] - 353:17,
364:19, 365:1,
365:2, 366:13,
384:18, 385:8,
389:3, 392:18,
464:20, 480:3,
482:1, 489:6, 489:7,
499:6, 499:8,
503:15, 521:14,
524:1, 530:22,
533:17, 552:11,
570:24, 610:20,
618:23, 647:11,
656:17, 658:4,
659:14, 660:10
issues [8] - 366:17,
397:12, 397:15,
409:7, 409:9, 482:3,

615:2, 624:5
IT [2] - 488:3, 488:4
itself [17] - 366:6,
455:23, 490:5,
491:9, 494:5, 498:3,
549:6, 569:21,
574:13, 583:23,
606:22, 619:14,
626:13, 629:17,
658:16, 665:5, 677:5
J-E-S-T-I-C-E [1] -
479:3
JACK [1] - 348:19
January [5] - 434:18,
437:4, 450:23,
451:7, 452:5
jestic [1] - 525:22
Jestic [66] - 358:11,
358:20, 360:17,
364:11, 478:21,
478:23, 479:3,
479:17, 479:21,
482:6, 483:18,
487:10, 488:13,
488:20, 489:3,
493:16, 497:10,
498:10, 499:4,
499:11, 500:12,
501:1, 502:17,
503:12, 505:24,
506:14, 509:2,
509:21, 512:2,
513:1, 523:23,
525:14, 530:2,
530:20, 531:10,
531:19, 533:11,
537:4, 539:15,
541:22, 545:2,
546:22, 547:14,
549:13, 550:20,
555:5, 556:17,
558:22, 559:10,
560:17, 561:22,
563:6, 564:11,
564:17, 565:1,
568:21, 572:9,
584:23, 589:11,
597:3, 597:7,
601:24, 603:7,
604:13, 605:20,
607:19
JESTICE [1] - 479:5
Jestic's [3] - 572:7,
579:7, 597:2
Jiaotong [1] - 390:7
job [5] - 485:21, 486:4,
487:24, 488:3,
601:16
Johanningmeier [6] -
632:3, 633:20,

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634:16, 635:21,
636:15, 649:1
JOHANNINGMEIER
[30] - 349:12, 632:5,
634:1, 634:12,
634:17, 635:18,
635:24, 636:4,
636:16, 636:20,
641:11, 641:16,
641:22, 642:5,
643:8, 643:10,
646:16, 647:12,
647:18, 647:20,
648:22, 649:11,
649:15, 649:21,
651:2, 655:9, 663:3,
669:15, 674:23,
691:6
John [1] - 610:9
JOHN [1] - 349:8
join [3] - 477:10,
612:6, 642:16
joined [11] - 383:7,
392:2, 411:20,
413:10, 413:21,
483:20, 612:8,
613:16, 654:3,
654:8, 654:11
joining [2] - 417:16,
516:14
Jones [16] - 532:5,
631:23, 633:2,
650:3, 652:14,
652:17, 655:7,
655:13, 661:13,
665:15, 666:13,
669:8, 690:4, 690:7,
690:8, 691:5
JONES [1] - 651:21
JOSH [1] - 348:22
Josh [3] - 372:20,
375:10, 690:13
Josh's [1] - 373:22
journal [1] - 568:3
judge [2] - 507:16,
507:24
Judge [1] - 348:15
judgment [1] - 360:2
jump [2] - 666:9,
667:17
jumped [1] - 389:20
jurors [4] - 571:1,
572:11, 575:16,
584:15
jury [68] - 367:3,
367:9, 367:10,
383:2, 386:6, 393:5,
395:8, 397:13,
398:9, 399:12,
401:9, 401:12,

406:9, 413:15,
417:2, 418:13,
418:14, 422:6,
432:20, 433:14,
433:23, 438:12,
438:13, 438:16,
479:19, 485:9,
486:18, 507:15,
508:1, 510:9,
512:14, 531:3,
531:6, 531:7,
532:13, 532:23,
533:1, 535:3,
583:15, 604:14,
608:5, 609:1,
620:13, 628:2,
631:13, 631:16,
633:17, 635:21,
636:12, 636:13,
650:14, 650:15,
652:10, 652:16,
653:5, 653:18,
656:3, 656:5,
656:24, 658:1,
659:4, 666:14,
667:19, 671:11,
676:21, 679:20,
688:8, 689:9
jury's [2] - 388:6,
437:23
KAI [1] - 382:12
Kai [9] - 352:18,
352:20, 354:4,
382:7, 383:3,
384:12, 385:11,
477:17, 499:24
Kamat [1] - 554:14
KATHERINE [1] -
348:23
keep [5] - 517:1,
563:17, 626:5,
688:19, 688:20
keeping [5] - 493:2,
610:24, 614:17,
618:22, 689:24
keeps [1] - 407:16
KEKER [1] - 349:11
KELLER [1] - 349:8
key [14] - 378:15,
378:24, 388:3,
418:5, 473:22,
473:23, 474:6,
544:20, 545:10,
614:8, 628:10,
628:23, 658:1,
658:20
killed [1] - 444:2
kilobytes [1] - 388:18
kind [47] - 356:18,
358:13, 399:2,

414:15, 415:16,
416:15, 416:21,
482:16, 483:11,
483:24, 487:19,
495:21, 612:23,
613:9, 614:5, 617:5,
618:18, 618:22,
619:11, 619:16,
619:23, 620:3,
621:19, 623:19,
623:24, 624:1,
624:3, 625:20,
625:24, 626:9,
626:11, 626:12,
626:15, 626:16,
628:10, 629:6,
629:23, 630:7,
630:13, 630:15,
630:18, 630:20,
635:10, 644:7,
656:11, 681:1, 689:8
kinds [7] - 442:16,
486:17, 492:14,
493:18, 497:11,
547:18, 603:23
King [1] - 348:12
Kingdom [1] - 482:11
Kixmoeller [2] -
549:15, 549:22
knowing [1] - 360:19
knowledge [2] -
357:23, 437:18
known [11] - 435:3,
435:4, 435:9, 485:2,
642:9, 648:5,
648:10, 648:13,
648:16, 649:19,
670:6
knows [3] - 359:23,
608:5, 630:18
Knoxville [1] - 654:10
Krevitt [9] - 355:17,
358:2, 358:7, 363:3,
363:14, 382:5,
412:3, 417:5, 419:24
KREVITT [103] -
348:22, 352:12,
352:17, 353:15,
353:20, 355:20,
356:13, 356:22,
357:4, 357:12,
357:16, 359:2,
359:6, 359:9,
359:18, 360:6,
360:13, 360:17,
360:22, 360:24,
361:23, 362:19,
363:5, 363:9,
363:15, 363:21,
364:2, 364:5, 364:9,

364:15, 364:18,
365:15, 366:3,
366:10, 382:6,
382:16, 382:19,
382:22, 383:22,
384:3, 384:23,
385:3, 385:5, 412:4,
412:12, 412:16,
412:19, 412:23,
413:3, 413:9,
413:13, 413:23,
414:6, 414:20,
415:7, 416:2, 416:5,
416:18, 416:22,
417:7, 420:1,
424:12, 424:18,
430:5, 430:12,
431:19, 432:2,
432:14, 432:21,
433:2, 433:9,
433:15, 434:2,
435:10, 436:7,
436:19, 437:17,
445:9, 450:16,
451:17, 453:7,
454:6, 457:23,
460:16, 474:1,
475:18, 475:20,
478:11, 478:16,
478:19, 508:8,
531:14, 531:22,
532:3, 607:20,
607:23, 631:20,
689:19, 690:7,
690:11, 690:19,
691:2, 691:8
label [1] - 379:4
labeled [5] - 378:15,
378:24, 574:8,
676:17, 676:20
Labor [1] - 483:2
Laboratory [1] - 654:5
laboratory [1] - 655:5
Labs [1] - 453:17
lack [2] - 557:6,
559:13
laid [1] - 581:5
landmark [2] - 556:8,
556:9
language [27] - 504:5,
506:21, 507:3,
507:10, 509:4,
509:18, 510:15,
510:24, 512:20,
521:7, 521:14,
522:24, 523:1,
528:1, 537:5, 606:9,
633:11, 668:12,
672:16, 675:4,
676:5, 677:16,

682:24, 683:20,
686:15, 686:24,
687:21
laptop [1] - 388:15
large [15] - 351:21,
388:20, 390:9,
485:23, 486:20,
489:10, 489:16,
489:17, 511:7,
602:20, 613:7,
618:19, 619:10,
626:7, 648:20
larger [4] - 562:11,
622:4, 676:2, 677:17
largest [1] - 397:6
Larry [1] - 394:6
laser [1] - 573:16
last [23] - 363:13,
368:9, 383:9, 403:8,
412:2, 417:3,
444:23, 464:10,
503:18, 512:13,
536:13, 565:10,
579:17, 579:18,
589:2, 592:13,
624:20, 628:6,
628:14, 632:6,
637:23, 679:1, 690:5
late [10] - 350:16,
351:24, 354:24,
360:5, 371:16,
375:11, 375:15,
437:4, 450:23, 451:7
latency [17] - 498:14,
499:3, 502:2, 502:3,
502:4, 502:7,
502:12, 502:15,
510:11, 511:4,
511:9, 511:10,
511:15, 541:10,
541:13, 566:23,
662:8
launch [3] - 380:10,
400:12, 401:6
launched [3] - 381:9,
381:11, 387:9
launching [1] - 402:11
LAURIDSEN [1] -
349:13
law [2] - 397:20, 434:9
Law [2] - 407:21,
407:22
lawsuit [3] - 443:14,
443:18, 552:11
lawyer [1] - 471:6
lawyers [6] - 441:20,
442:2, 461:2,
508:17, 508:19,
688:12
laymen's [1] - 606:13

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|-------------------------------|-------------------------------|----------------------------------|---------------------------------|-------------------------------|
| layout [1] - 669:5 | 663:10, 679:22 | 513:9, 522:5, | load [3] - 429:9, 601:1, | 408:12, 418:8, |
| lead [1] - 613:23 | Level [2] - 640:9, | 528:15, 569:16, | 601:2 | 418:15, 424:22, |
| leadership [1] - | 640:12 | 570:18, 571:23, | lobbed [1] - 352:7 | 425:9, 429:20, |
| 373:12 | Li [73] - 350:12, | 680:8, 683:18, | local [3] - 410:2, | 430:17, 436:3, |
| leading [5] - 351:15, | 350:14, 352:18, | 683:22 | 410:7, 473:13 | 442:4, 459:20, |
| 380:21, 419:22, | 352:20, 354:4, | limitations [3] - | locate [5] - 456:10, | 477:10, 490:11, |
| 525:10, 604:9 | 357:22, 359:3, | 625:21, 683:16, | 680:18, 682:6, | 490:12, 494:24, |
| learn [5] - 386:10, | 359:4, 359:23, | 686:14 | 683:6, 685:9 | 496:14, 517:24, |
| 395:1, 638:16, | 360:6, 364:2, 382:7, | limited [7] - 447:3, | located [3] - 630:10, | 561:9, 561:10, |
| 689:5, 689:6 | 382:23, 383:3, | 560:5, 562:4, | 667:7, 682:17 | 581:8, 581:19, |
| learned [3] - 451:13, | 383:20, 384:12, | 562:15, 595:12, | location [6] - 456:20, | 584:21, 596:11, |
| 453:21, 638:18 | 385:7, 385:11, | 599:16, 603:4 | 618:6, 679:18, | 604:1, 607:13, |
| learning [1] - 616:1 | 405:2, 417:2, 422:5, | Line [2] - 641:1, 641:8 | 680:1, 680:23, 685:6 | 619:18, 631:9, |
| least [7] - 469:3, | 424:20, 430:13, | line [33] - 387:23, | locations [1] - 645:18 | 647:5, 672:15, |
| 508:13, 571:2, | 432:15, 432:22, | 400:2, 400:8, 403:5, | logic [1] - 518:24 | 672:17, 681:8 |
| 620:1, 655:17, | 432:23, 433:8, | 404:1, 419:15, | logical [4] - 627:14, | looks [7] - 360:11, |
| 656:13, 683:11 | 433:10, 434:8, | 429:19, 442:16, | 630:14, 658:13, | 447:12, 468:11, |
| leave [4] - 363:12, | 434:18, 436:12, | 442:19, 459:16, | 684:9 | 496:2, 496:9, 605:2, |
| 391:8, 395:6, 439:21 | 437:24, 438:19, | 542:9, 562:19, | logically [1] - 673:16 | 618:18 |
| leaving [3] - 391:6, | 438:21, 439:3, | 579:3, 579:20, | London [2] - 482:12, | lookup [3] - 519:12, |
| 531:7, 678:15 | 439:5, 443:16, | 579:21, 583:10, | 483:6 | 519:13, 520:2 |
| LED [3] - 566:18, | 444:19, 445:18, | 584:5, 585:24, | look [48] - 355:13, | lookups [3] - 519:8, |
| 566:21, 566:23 | 449:23, 450:21, | 586:3, 586:24, | 372:22, 414:8, | 519:10, 520:9 |
| led [1] - 391:8 | 451:16, 453:15, | 587:24, 588:7, | 418:7, 422:16, | lose [2] - 397:21, |
| left [23] - 418:4, | 454:5, 454:14, | 588:22, 589:6, | 423:21, 427:15, | 626:2 |
| 418:17, 486:11, | 457:17, 458:4, | 607:8, 607:10, | 427:18, 430:13, | lost [10] - 356:6, |
| 489:19, 489:24, | 458:11, 458:16, | 627:1, 627:21, | 430:15, 441:15, | 361:14, 361:23, |
| 494:3, 500:5, 514:4, | 459:15, 461:17, | 627:22, 662:17, | 454:17, 456:19, | 397:16, 398:2, |
| 518:12, 535:15, | 463:18, 464:22, | 665:14, 667:9 | 486:5, 505:17, | 398:5, 614:19, |
| 538:4, 539:11, | 465:10, 466:9, | lines [8] - 459:15, | 507:13, 509:6, | 621:12, 621:21, |
| 542:2, 546:1, 562:1, | 467:23, 468:13, | 463:18, 463:20, | 526:18, 545:20, | 687:11 |
| 609:24, 616:6, | 469:21, 470:12, | 468:1, 620:6, 627:8, | 551:14, 557:7, | louder [2] - 474:3, |
| 616:7, 622:9, | 471:22, 472:16, | 627:13, 639:10 | 560:12, 560:18, | 647:9 |
| 668:11, 674:18, | 474:2, 475:16, | list [4] - 481:14, 516:6, | 561:4, 561:11, | love [1] - 619:24 |
| 676:19, 681:4 | 475:21, 477:8, | 517:18, 537:18 | 573:1, 580:14, | loved [1] - 392:11 |
| left-hand [3] - 494:3, | 478:13, 499:24, | listed [12] - 361:19, | 580:16, 581:16, | low [5] - 405:19, |
| 500:5, 518:12 | 501:8, 502:17, | 500:2, 500:4, | 589:15, 590:6, | 441:22, 510:11, |
| leg [4] - 355:18, | 550:21, 551:4, | 504:20, 539:11, | 599:8, 605:1, 606:2, | 511:4, 511:15 |
| 355:19, 355:20, | 551:16, 568:9 | 542:11, 546:15, | 606:7, 607:4, | lower [4] - 403:11, |
| 355:21 | LI [1] - 382:12 | 566:20, 579:3, | 609:12, 623:20, | 441:22, 500:5, |
| legal [1] - 507:24 | Li's [1] - 554:22 | 610:4, 610:7, 640:24 | 624:3, 625:7, | 532:20 |
| length [1] - 539:13 | librarian [1] - 491:10 | listened [1] - 505:20 | 626:23, 627:20, | lowered [1] - 533:5 |
| lengthy [2] - 691:7, | library [5] - 395:13, | listening [2] - 365:7, | 636:8, 639:7, | lunch [6] - 364:7, |
| 691:9 | 395:23, 396:1, | 365:9 | 646:21, 666:6, | 364:14, 530:24, |
| less [5] - 369:21, | 406:24, 491:11 | literal [4] - 569:15, | 674:13, 677:15 | 531:4, 533:4, 533:12 |
| 491:1, 492:17, | life [1] - 399:14 | 569:22, 586:8, | looked [26] - 389:4, | luncheon [1] - 532:11 |
| 532:10, 622:14 | light [1] - 480:14 | 586:12 | 456:13, 456:15, | lunchtime [2] - 691:1, |
| letter [22] - 353:13, | likely [2] - 516:24, | literally [4] - 527:24, | 456:16, 483:2, | 691:9 |
| 354:7, 355:7, 358:6, | 580:15 | 528:6, 528:16, | 503:13, 505:10, | lure [1] - 377:9 |
| 361:12, 361:15, | likewise [1] - 546:14 | 569:12 | 505:21, 505:23, | MacLellan [1] - 610:10 |
| 411:22, 412:10, | Limerick [1] - 611:18 | litigation [3] - 411:13, | 526:22, 537:6, | magnetic [6] - 396:5, |
| 413:2, 413:4, 413:7, | liminae [1] - 365:20 | 441:13, 637:8 | 537:8, 538:9, 540:8, | 398:13, 406:17, |
| 413:8, 413:16, | limine [6] - 352:18, | live [2] - 611:10, | 551:10, 558:9, | 443:8, 498:4, 590:22 |
| 413:22, 414:7, | 352:19, 352:22, | 611:11 | 560:8, 560:16, | Mahesh [1] - 554:14 |
| 414:21, 415:8, | 352:24, 353:5, 354:1 | lived [2] - 611:11, | 573:9, 581:5, | mail [8] - 371:24, |
| 415:12, 415:21, | limit [1] - 588:24 | 611:12 | 583:11, 594:9, | 372:10, 372:11, |
| 668:8 | limitation [15] - | living [1] - 483:19 | 638:20, 659:14, | 372:20, 372:23, |
| level [7] - 388:7, | 509:14, 509:23, | LLP [5] - 348:19, | 665:19 | 373:6, 373:10, 374:4 |
| 406:4, 406:9, | 512:4, 512:13, | 348:21, 349:3, | looking [33] - 358:6, | mails [1] - 516:22 |
| 500:19, 660:3, | 512:14, 512:20, | 349:8, 349:11 | 361:12, 394:15, | main [6] - 428:2, |

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

428:6, 431:12,
551:12, 614:4, 614:7
maintain [2] - 477:1,
478:7
maintained [1] -
354:13
major [2] - 495:12,
629:4
manage [2] - 535:19,
565:17
managed [1] - 488:4
management [5] -
373:21, 374:16,
374:22, 394:13,
532:19
manager [1] - 488:3
managers [1] - 487:2
Manchuria [1] - 390:3
mandatory [3] -
544:20, 545:12,
550:1
manner [2] - 614:20,
634:2
manuals [2] - 505:21,
505:23
manufacture [2] -
590:18, 590:21
manufacturer [1] -
488:10
map [1] - 418:21
mapping [2] - 629:1,
645:1
March [20] - 348:10,
422:20, 422:21,
423:24, 427:5,
427:10, 427:15,
427:21, 428:16,
428:21, 429:2,
457:6, 469:17,
469:22, 470:5,
470:6, 472:1, 476:4,
692:11, 692:15
margin [3] - 403:7,
403:15, 403:19
marginal [1] - 369:16
marginalized [1] -
373:16
margins [1] - 403:14
Mark [3] - 532:5,
650:3, 652:17
mark [3] - 428:2,
512:11, 651:21
marked [4] - 383:21,
384:5, 494:11,
678:20
market [46] - 351:10,
351:13, 355:15,
357:22, 366:16,
371:16, 371:19,
374:11, 375:12,

375:15, 377:23,
378:5, 378:10,
379:5, 379:13,
379:14, 379:16,
379:22, 381:8,
381:15, 381:16,
381:18, 387:16,
387:18, 400:15,
403:21, 403:23,
404:2, 429:20,
442:11, 442:14,
442:24, 443:1,
443:2, 444:8, 445:8,
446:2, 446:6,
474:21, 475:2,
475:3, 475:7, 591:2,
591:5, 591:10
marketing [9] -
373:20, 374:2,
374:17, 374:22,
380:14, 474:24,
475:11, 591:13,
600:9
marketplace [3] -
366:6, 375:22,
400:20
marks [2] - 539:24,
678:14
Massachusetts [2] -
611:13, 612:2
massive [1] - 613:9
master [1] - 390:15
masters [2] - 611:23,
612:3
match [7] - 517:10,
518:1, 518:5, 529:6,
587:12, 657:4, 657:7
matched [1] - 518:6
matches [2] - 518:10,
520:17
materials [3] - 441:15,
505:17, 508:10
math [1] - 621:7
mathematical [1] -
620:17
mathematics [2] -
426:23, 654:3
Matt [1] - 549:15
matter [10] - 374:9,
435:22, 441:12,
469:15, 568:12,
577:22, 591:4,
594:5, 625:17,
692:12
matters [1] - 621:7
MATTHEW [2] - 349:3,
349:12
Matthew [1] - 608:7
maximum [4] -
560:13, 561:5

561:6, 666:19
MBA [1] - 612:1
McClellan [2] - 637:2,
637:20
mean [36] - 358:17,
360:18, 366:12,
388:9, 389:12,
403:13, 409:20,
410:6, 410:11,
413:9, 413:10,
414:2, 415:17,
420:9, 423:1, 427:9,
436:14, 443:13,
444:17, 461:21,
486:1, 502:24,
510:22, 512:24,
537:13, 574:7,
598:11, 598:24,
614:4, 614:15,
614:21, 619:10,
634:18, 645:15,
648:20, 662:4
meaning [8] - 387:12,
473:13, 507:22,
509:3, 509:9,
628:23, 668:18,
668:20
meaningful [1] - 633:4
means [27] - 400:9,
407:24, 408:2,
410:12, 422:10,
422:22, 423:3,
444:16, 454:4,
502:15, 504:9,
504:10, 535:7,
569:16, 571:5,
571:12, 576:18,
585:9, 612:19,
614:17, 615:10,
621:9, 622:23,
630:18, 656:6,
662:13, 690:16
meant [8] - 401:15,
442:14, 471:13,
471:14, 472:4,
487:1, 560:19, 614:3
meanwhile [2] - 408:7,
429:10
measure [1] - 566:23
mechanical [4] -
443:6, 443:8,
444:15, 485:13
media [9] - 396:4,
396:12, 396:24,
406:17, 408:12,
443:9, 444:18,
491:19, 492:14
medical [1] - 439:21
medium [1] - 504:7
meet [15] - 503:22,

509:23, 513:8,
527:3, 527:17,
528:1, 528:15,
528:16, 570:18,
600:5, 600:7, 602:8,
605:12, 683:21,
688:12
meeting [2] - 467:19,
468:4
meets [14] - 440:16,
509:13, 512:4,
522:5, 525:24,
527:5, 528:7,
533:14, 605:9,
672:21, 675:8,
680:8, 683:23, 686:9
megabytes [6] -
410:13, 410:14,
484:21, 484:22,
485:3, 485:4
member [4] - 383:8,
392:3, 441:3, 446:20
members [9] - 367:8,
367:10, 417:1,
438:15, 507:15,
531:3, 533:1,
631:12, 688:8
memorialized [1] -
353:8
memories [6] -
491:23, 497:18,
623:1, 623:3, 624:1,
626:10
memory [204] -
401:24, 414:22,
442:20, 446:12,
463:15, 468:9,
469:9, 492:15,
497:19, 498:23,
510:12, 511:4,
511:5, 511:7,
511:11, 511:15,
511:16, 541:11,
541:13, 574:4,
612:17, 612:22,
613:23, 618:21,
619:9, 619:14,
619:20, 619:21,
619:24, 620:1,
620:5, 620:10,
623:7, 623:11,
623:21, 623:22,
624:22, 625:17,
625:19, 625:23,
626:3, 626:13,
626:15, 626:18,
627:20, 627:23,
628:5, 628:8, 628:9,
628:12, 628:13,
628:14, 628:17,

628:19, 628:23,
629:14, 629:16,
629:23, 630:3,
630:5, 630:9,
630:13, 630:17,
630:18, 631:9,
643:13, 643:18,
643:20, 644:7,
644:8, 644:9,
644:10, 644:17,
645:6, 645:10,
645:14, 645:17,
645:24, 647:6,
647:14, 648:9,
648:15, 648:20,
649:9, 649:17,
654:23, 658:7,
658:9, 658:15,
658:17, 658:20,
658:21, 658:22,
658:23, 659:1,
659:10, 659:11,
662:4, 662:5,
662:11, 662:15,
664:15, 664:22,
665:4, 665:17,
665:20, 665:22,
665:23, 666:2,
666:16, 666:20,
666:23, 667:3,
667:13, 667:14,
667:15, 667:20,
667:21, 667:23,
668:3, 668:4, 668:5,
668:7, 668:9,
668:13, 668:17,
668:19, 669:1,
669:21, 669:22,
669:24, 670:3,
670:4, 670:6, 670:7,
670:15, 670:16,
670:17, 670:20,
671:1, 671:2, 671:4,
671:18, 671:20,
671:22, 671:23,
672:10, 672:18,
672:19, 672:22,
673:14, 674:3,
675:6, 677:18,
678:3, 678:8, 679:4,
679:7, 679:10,
679:24, 680:1,
680:5, 680:7,
680:14, 680:17,
680:22, 681:2,
681:3, 681:4, 681:5,
681:7, 681:12,
681:15, 681:23,
682:14, 682:22,
684:12, 684:18,
685:6, 685:14,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

685:15, 685:16,
685:18, 685:21,
685:24, 686:16,
686:19, 686:20,
686:22, 687:3, 687:4
Memory [1] - 666:11
mention [5] - 444:10,
448:18, 516:9,
592:8, 592:10
mentioned [37] -
385:19, 386:4,
406:17, 429:23,
431:11, 434:23,
444:13, 448:24,
456:5, 473:5,
474:24, 493:22,
495:21, 523:10,
525:23, 554:21,
592:23, 617:12,
619:3, 627:18,
637:1, 642:12,
643:11, 643:17,
644:3, 644:13,
645:9, 649:16,
662:10, 664:4,
668:24, 670:24,
674:4, 674:7, 675:5,
680:11, 681:12
mentions [2] - 684:12,
685:14
Merit [1] - 692:7
mess [1] - 625:24
message [4] - 373:1,
373:13, 375:5,
602:15
met [22] - 386:14,
394:2, 394:8,
394:10, 394:17,
523:4, 523:6,
529:13, 569:16,
637:11, 637:18,
637:23, 667:9,
675:10, 676:9,
676:10, 678:15,
685:18, 686:17,
687:15, 690:14
metadata [10] -
420:17, 421:2,
421:3, 422:17,
423:21, 466:10,
466:13, 467:3,
469:16, 470:4
method [6] - 388:10,
408:20, 535:8,
604:15, 604:22,
630:8
Michael [3] - 608:1,
608:10, 609:2
MICHAEL [2] - 608:11,
608:13

microphone [2] -
624:15, 652:21
mid [3] - 381:11,
418:10, 691:10
mid-February [1] -
418:10
middle [6] - 381:14,
419:3, 598:12,
661:16, 668:6, 682:4
midnight [1] - 407:12
might [7] - 353:5,
369:3, 485:9,
526:18, 597:4,
624:4, 624:5
million [13] - 400:22,
400:23, 401:3,
401:11, 401:20,
401:24, 402:1,
402:2, 402:4, 402:6,
402:8, 402:14
mind [4] - 437:23,
626:5, 688:20,
688:23
mine [2] - 394:5,
477:23
minimal [2] - 351:23,
662:7
minor [8] - 362:6,
428:1, 428:9,
428:10, 458:22,
459:8, 652:3, 653:21
minute [7] - 363:12,
449:14, 504:3,
575:8, 596:22,
635:17, 650:6
minutes [14] - 363:18,
364:5, 366:24,
432:20, 433:6,
460:5, 523:12,
525:22, 531:5,
631:15, 635:10,
635:17, 690:18,
690:22
mirroring [15] -
617:22, 617:23,
618:3, 618:11,
618:18, 622:7,
622:10, 625:7,
625:8, 640:6, 640:8,
641:23, 642:7,
649:18, 649:20
misleading [1] -
633:16
missing [5] - 433:9,
569:5, 621:11,
621:17, 629:8
mission [2] - 395:9,
395:12
misstated [1] - 674:20
modern [1] - 485:9

modest [1] - 393:4
modified [1] - 525:18
modifying [1] - 541:6
module [2] - 425:24,
431:12
modules [3] - 425:24,
580:10, 581:22
moment [9] - 361:5,
363:5, 385:15,
522:24, 564:14,
583:12, 611:6,
680:12, 689:16
money [7] - 365:22,
365:23, 403:9,
440:9, 475:9, 498:9,
532:20
monitors [2] - 566:18,
566:21
month [25] - 368:9,
374:10, 386:21,
435:5, 457:15,
460:6, 460:18,
461:7, 461:13,
461:21, 461:22,
461:23, 461:24,
462:4, 463:11,
464:13, 466:2,
467:11, 467:18,
469:3, 470:7,
470:14, 471:8,
471:21, 472:8
months [9] - 373:14,
399:11, 399:22,
404:15, 407:20,
429:15, 430:1,
439:10, 439:11
Moore [4] - 407:17,
407:18, 407:21,
407:22
morning [27] - 350:1,
350:9, 350:10,
350:12, 353:17,
354:21, 363:14,
367:8, 367:17,
367:19, 380:6,
380:7, 382:23,
382:24, 407:13,
432:19, 439:3,
439:4, 479:17,
479:18, 568:10,
572:11, 582:14,
582:21, 583:11,
584:15, 691:15
morning's [1] - 572:7
MORRIS [1] - 348:19
most [12] - 351:16,
374:9, 393:8, 407:8,
426:22, 429:22,
477:18, 492:5,
565:14, 580:15,

615:7, 687:4
motion [6] - 352:18,
352:22, 352:24,
354:1, 365:20
motions [1] - 353:4
Mountain [1] - 397:5
mouth [1] - 351:2
move [30] - 396:15,
399:21, 400:5,
405:24, 408:3,
412:1, 416:22,
416:23, 424:12,
430:6, 431:20,
444:19, 450:14,
454:10, 506:8,
510:8, 532:5, 546:5,
546:14, 549:20,
553:13, 554:5,
641:12, 643:9,
651:18, 652:6,
669:14, 679:1,
681:7, 682:4
moved [3] - 365:20,
464:18, 482:24
movement [1] - 575:6
movie [1] - 491:1
moving [11] - 407:9,
490:16, 535:20,
537:16, 574:9,
574:11, 575:13,
612:5, 641:14,
662:14, 662:15
MP3 [1] - 395:16
MP? [1] - 677:2
MR [294] - 350:4,
350:8, 350:11,
350:14, 352:12,
352:17, 353:15,
353:20, 354:8,
354:20, 355:8,
355:12, 355:20,
356:13, 356:22,
357:4, 357:12,
357:14, 357:16,
357:20, 358:5,
358:10, 358:18,
358:24, 359:2,
359:6, 359:9,
359:18, 359:19,
359:22, 360:6,
360:10, 360:13,
360:17, 360:22,
360:24, 361:4,
361:23, 362:1,
362:14, 362:19,
362:21, 363:1,
363:5, 363:9,
363:15, 363:21,
364:2, 364:5, 364:9,
364:15, 364:18,

365:15, 366:3,
366:10, 367:14,
367:16, 372:3,
372:8, 377:1, 377:6,
379:24, 380:20,
382:6, 382:16,
382:19, 382:22,
383:22, 384:3,
384:23, 385:3,
385:5, 411:24,
412:4, 412:12,
412:15, 412:16,
412:18, 412:19,
412:23, 413:3,
413:9, 413:13,
413:14, 413:18,
413:20, 413:23,
414:6, 414:17,
414:20, 414:24,
415:7, 415:9, 416:2,
416:5, 416:17,
416:18, 416:22,
417:7, 419:21,
420:1, 424:12,
424:14, 424:18,
430:5, 430:8,
430:12, 431:19,
431:22, 432:2,
432:14, 432:21,
433:2, 433:3, 433:9,
433:11, 433:15,
434:2, 434:15,
435:2, 435:10,
435:14, 436:2,
436:7, 436:18,
436:19, 436:21,
437:12, 437:17,
438:9, 438:20,
438:24, 439:2,
445:9, 445:13,
445:17, 450:14,
450:16, 450:20,
451:17, 452:2,
452:3, 453:3, 453:7,
453:12, 454:6,
454:11, 454:13,
457:23, 458:3,
458:10, 460:16,
460:20, 465:8,
465:15, 474:1,
474:9, 475:16,
475:18, 475:20,
478:11, 478:16,
478:19, 479:9,
479:12, 479:16,
488:19, 488:22,
489:2, 506:7, 506:9,
506:13, 508:8,
508:23, 509:1,
525:9, 525:13,
531:2, 531:13,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|--|---|--|--|--|
| 531:14, 531:16, 531:22, 532:3, 532:14, 532:22, 533:8, 533:10, 544:16, 544:18, 545:1, 546:4, 546:6, 546:13, 546:17, 546:21, 549:5, 549:12, 553:12, 553:14, 553:18, 554:4, 554:6, 554:10, 564:10, 564:13, 564:16, 564:20, 564:24, 582:23, 583:5, 601:17, 601:21, 601:23, 604:8, 604:12, 604:17, 607:16, 607:20, 607:23, 608:6, 608:17, 608:21, 609:19, 609:23, 631:11, 631:20, 631:22, 632:2, 632:5, 632:24, 634:1, 634:12, 634:17, 634:23, 635:5, 635:18, 635:24, 636:4, 636:9, 636:16, 636:20, 641:11, 641:13, 641:16, 641:22, 642:5, 643:3, 643:8, 643:10, 645:21, 646:11, 646:16, 647:7, 647:10, 647:12, 647:18, 647:20, 648:22, 649:2, 649:4, 649:11, 649:15, 649:21, 650:2, 651:2, 651:16, 651:18, 652:5, 652:12, 652:13, 655:6, 655:9, 655:12, 661:7, 661:12, 663:1, 663:3, 663:6, 669:13, 669:15, 669:18, 674:21, 674:23, 675:2, 688:5, 689:19, 689:21, 690:7, 690:11, 690:19, 691:2, 691:6, 691:8, 691:11 MS [4] - 372:5, 377:3, 380:5, 381:23 multimillion [1] - 486:4 | multiple [14] - 353:6, 472:22, 483:16, 539:2, 539:9, 604:1, 607:13, 625:12, 654:18, 656:10, 672:2, 672:7, 675:15, 681:20 multistep [1] - 571:22 music [1] - 395:15 must [5] - 506:22, 587:3, 665:4, 665:5, 686:20 name [47] - 357:10, 360:15, 383:1, 383:3, 387:8, 387:18, 418:10, 421:11, 455:17, 461:3, 461:12, 462:1, 467:2, 471:19, 472:11, 474:23, 477:13, 479:1, 479:2, 484:23, 485:1, 487:18, 515:5, 515:10, 516:12, 518:13, 519:15, 519:21, 519:22, 520:1, 536:7, 536:10, 549:15, 572:14, 604:5, 604:21, 608:5, 608:7, 608:9, 608:24, 609:2, 610:4, 652:15, 652:17, 656:6, 660:21, 690:5 named [7] - 411:17, 421:12, 421:16, 421:19, 427:11, 617:7, 637:1 namely [1] - 445:8 nametags [1] - 516:9 Napper [1] - 690:15 narrow [1] - 415:4 National [2] - 393:9, 654:4 natural [1] - 459:5 nature [1] - 427:20 necessarily [2] - 412:5, 635:2 necessary [1] - 413:24 need [46] - 353:19, 363:9, 369:23, 396:22, 402:15, 407:5, 410:13, 412:14, 423:15, 426:22, 461:4, 468:18, 475:14, 486:7, 497:4, 557:4, 559:12, 560:12, | 560:17, 560:22, 561:1, 561:2, 561:4, 561:13, 561:16, 561:18, 562:22, 563:5, 568:22, 586:12, 588:17, 590:6, 592:22, 595:8, 595:12, 600:5, 600:20, 603:20, 605:11, 618:17, 622:14, 629:11, 631:19, 682:4, 682:5, 689:6 needed [7] - 374:18, 418:19, 522:21, 578:21, 602:10, 603:1, 681:17 needs [8] - 486:6, 561:8, 563:4, 601:1, 615:23, 634:23, 651:12, 652:10 negotiations [1] - 353:6 NEST [88] - 349:11, 349:11, 350:4, 350:8, 350:11, 350:14, 354:8, 354:20, 355:8, 355:12, 358:5, 358:10, 358:18, 359:22, 361:4, 362:1, 362:14, 362:21, 363:1, 411:24, 412:15, 412:18, 413:14, 413:18, 413:20, 414:17, 414:24, 415:9, 416:17, 419:21, 424:14, 430:8, 431:22, 433:3, 433:11, 434:15, 435:2, 435:14, 436:2, 436:18, 436:21, 437:12, 438:9, 438:20, 438:24, 439:2, 445:13, 445:17, 450:14, 450:20, 452:2, 452:3, 453:3, 453:12, 454:11, 454:13, 458:3, 458:10, 460:20, 465:8, 465:15, 474:9, 475:16, 488:22, 506:9, 525:9, 531:13, 531:16, 532:14, 532:22, 544:16, 546:6, 546:17, | 554:6, 564:13, 564:16, 564:20, 564:24, 583:5, 601:17, 604:8, 604:17, 631:22, 632:2, 689:21, 691:11 Nest [23] - 354:7, 358:4, 361:3, 361:12, 366:12, 433:19, 434:14, 435:13, 437:7, 438:1, 438:18, 452:1, 454:10, 458:8, 460:18, 465:13, 475:21, 475:24, 603:8, 605:6, 605:20, 607:7, 690:16 Nest's [1] - 365:3 network [2] - 388:21, 407:19 never [14] - 350:24, 351:11, 359:23, 359:24, 442:21, 443:20, 444:7, 460:6, 465:19, 557:24, 568:1, 568:5, 568:8, 622:3 new [20] - 368:10, 368:13, 386:10, 386:11, 387:17, 394:12, 395:2, 399:2, 400:4, 405:13, 405:22, 406:2, 406:6, 418:23, 452:15, 464:19, 622:22, 654:21 New [1] - 692:2 news [1] - 360:4 next [40] - 375:4, 375:6, 382:7, 384:5, 402:3, 429:4, 452:13, 478:17, 506:24, 514:18, 514:21, 515:24, 520:13, 531:21, 535:22, 554:1, 579:8, 607:24, 614:7, 619:5, 619:18, 620:11, 621:6, 622:6, 623:13, 623:23, 629:10, 650:2, 656:16, 657:11, 660:1, 663:7, 672:17, 675:4, 676:5, 677:20, 678:2, 678:13, | 680:6, 689:15 nexus [2] - 358:15, 358:16 nice [1] - 689:10 NICHOLS [1] - 348:19 night [2] - 616:4, 632:6 nine [3] - 377:8, 611:3, 691:15 nobody [1] - 663:22 non [7] - 593:10, 593:14, 593:16, 593:18, 593:20, 595:3, 595:4 non-infringing [7] - 593:10, 593:14, 593:16, 593:18, 593:20, 595:3, 595:4 none [7] - 437:19, 438:1, 531:14, 581:12, 581:21, 582:8, 686:24 noninfringing [11] - 530:22, 533:17, 533:19, 534:8, 538:20, 539:1, 540:1, 542:7, 563:15, 563:23, 601:6 normally [2] - 376:14, 586:10 Northeastern [1] - 611:24 Notary [1] - 692:8 note [2] - 373:10, 669:13 notes [3] - 467:19, 468:5, 692:11 nothing [8] - 381:24, 526:20, 539:3, 589:9, 601:17, 644:5, 689:19, 691:14 notice [1] - 352:8 noticed [2] - 365:7, 532:17 novel [2] - 623:7, 658:14 November [2] - 371:5, 381:12 number [40] - 350:18, 350:22, 350:23, 351:6, 351:14, 360:20, 378:10, 381:15, 381:19, 448:24, 450:2, 498:7, 557:18, 595:14, 601:15, 602:1, 620:21, 620:23, 621:1, |
|--|---|--|--|--|

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

621:4, 621:16,
642:3, 674:3, 675:7,
675:17, 675:19,
679:23, 680:9,
680:17, 681:12,
681:14, 682:17,
683:3, 684:17,
684:21, 685:5,
690:20
numbers [11] -
351:21, 356:20,
362:2, 362:8,
401:11, 401:18,
430:16, 627:1,
636:5, 686:1
numerous [3] -
392:20, 393:3,
409:19
o'clock [2] - 407:12,
691:15
oath [7] - 382:14,
457:18, 464:14,
470:14, 479:7,
608:15, 651:23
object [6] - 350:20,
422:11, 546:8,
553:21, 634:19,
635:23
objecting [2] - 632:11,
632:16
objection [62] -
354:24, 372:5,
372:7, 377:3, 377:5,
380:20, 384:2,
385:2, 403:10,
411:24, 419:21,
424:14, 424:17,
430:8, 430:11,
431:22, 432:1,
433:18, 445:9,
445:16, 450:16,
450:19, 454:7,
454:9, 457:24,
488:22, 506:9,
506:12, 525:9,
544:16, 544:24,
546:7, 546:11,
546:12, 546:17,
546:20, 549:5,
553:14, 553:17,
554:6, 554:9,
582:23, 582:24,
583:2, 604:8,
604:17, 609:22,
632:21, 633:20,
643:3, 645:21,
646:11, 646:15,
647:7, 647:17,
655:9, 663:3, 663:5,
669:15, 669:17,

674:23, 675:1
objections [5] - 354:3,
354:23, 355:3,
361:13, 634:5
observe [1] - 557:17
obtain [1] - 611:21
obtained [1] - 472:22
obvious [1] - 378:4
obviously [13] -
351:19, 381:7,
418:13, 437:21,
445:11, 462:9,
477:23, 487:5,
488:1, 568:21,
585:22, 624:19,
654:16
obviousness [6] -
351:6, 354:11,
354:13, 354:21,
355:14, 362:5
occupation [1] -
652:23
occur [1] - 468:4
occurred [1] - 451:7
occurring [1] - 603:24
occurs [1] - 585:16
October [9] - 376:11,
377:21, 378:9,
379:12, 386:20,
393:16, 399:11,
404:22, 404:23
odd [1] - 620:23
OF [2] - 348:1, 692:5
offensive [1] - 351:17
offer [13] - 372:4,
377:2, 411:21,
411:22, 412:10,
413:16, 413:22,
414:7, 532:19,
534:18, 609:20,
663:1, 674:21
offered [3] - 350:16,
537:9, 538:1
offering [3] - 368:2,
530:14, 530:18
office [10] - 424:4,
438:3, 454:15,
454:23, 455:3,
456:16, 456:18,
456:19, 456:22,
456:24
Office [3] - 483:9,
483:14, 488:17
officer [1] - 439:13
official [1] - 455:3
offset [7] - 680:18,
680:23, 681:6,
681:16, 681:17,
682:5, 682:18
often [3] - 370:17,

376:21, 397:7
old [7] - 448:12, 463:5,
463:6, 464:3,
464:11, 465:17,
466:3
older [1] - 590:21
On-Line [1] - 641:1
on-Line [1] - 641:8
once [6] - 394:10,
394:17, 424:4,
521:10, 629:9, 675:3
one [199] - 350:11,
350:24, 354:10,
364:19, 368:23,
370:6, 370:10,
372:15, 375:2,
376:1, 377:13,
377:15, 378:2,
379:13, 381:15,
381:19, 382:7,
383:18, 384:18,
385:13, 386:21,
393:9, 394:1, 394:7,
394:9, 395:20,
403:3, 404:23,
406:15, 408:5,
408:16, 408:21,
412:10, 414:8,
416:7, 416:17,
418:10, 423:8,
423:13, 423:22,
423:23, 425:17,
426:6, 427:12,
429:6, 434:5, 435:6,
435:16, 437:2,
439:5, 442:17,
446:6, 447:5,
447:23, 449:7,
449:9, 456:20,
459:22, 464:8,
465:1, 466:8,
466:17, 468:17,
473:6, 477:8,
477:11, 480:8,
480:24, 481:4,
481:5, 481:8,
484:11, 484:13,
485:13, 488:1,
489:11, 490:8,
492:3, 492:17,
492:21, 493:10,
493:13, 493:21,
495:5, 498:1,
499:11, 502:6,
506:3, 506:5,
507:15, 511:20,
513:7, 514:3,
516:23, 521:8,
522:24, 523:5,
523:11, 524:4,

524:9, 526:13,
531:4, 535:24,
536:14, 538:1,
538:2, 540:22,
547:9, 547:12,
547:21, 548:9,
550:1, 550:11,
554:1, 556:5,
560:22, 569:5,
570:7, 572:8, 573:8,
577:10, 579:3,
579:20, 581:10,
583:10, 583:17,
584:18, 587:18,
589:3, 589:6, 592:2,
597:17, 598:2,
599:20, 600:19,
601:14, 604:24,
607:8, 607:10,
609:7, 617:7, 619:4,
619:14, 620:23,
620:24, 621:13,
622:14, 627:9,
628:22, 629:3,
632:18, 633:9,
634:7, 637:4,
639:10, 640:24,
642:8, 644:24,
649:2, 649:12,
655:19, 655:20,
656:13, 658:3,
660:6, 661:4, 667:5,
669:24, 670:19,
670:20, 672:5,
672:6, 673:1, 673:7,
673:8, 673:11,
673:20, 674:1,
674:18, 675:16,
676:17, 677:20,
678:8, 678:15,
678:21, 680:12,
682:16, 684:6,
685:24, 686:11,
687:1, 687:4,
687:11, 688:9,
688:22, 690:21
one-hour [1] - 531:4
ones [14] - 517:2,
542:3, 599:7,
599:17, 620:21,
620:23, 621:1,
621:3, 621:5,
621:16, 621:17,
634:20, 636:3
online [2] - 646:22,
646:23
onwards [1] - 371:1
open [8] - 433:16,
450:4, 458:7,
459:14, 463:17,

609:11, 688:20,
689:24
opened [4] - 365:3,
366:2, 464:8, 464:18
opening [12] - 365:3,
365:7, 366:9, 438:1,
523:13, 570:2,
578:12, 579:7,
579:10, 579:14,
579:23, 579:24
operate [2] - 573:5,
580:11
operated [1] - 575:16
operates [3] - 578:6,
580:6, 659:24
operating [5] - 373:2,
495:15, 497:12,
497:13, 505:4
operation [7] - 576:24,
620:17, 621:14,
621:15, 625:10,
625:13, 657:1
operations [2] -
561:20, 626:16
opinion [88] - 358:10,
358:18, 359:1,
359:2, 360:4, 361:6,
361:9, 361:10,
362:18, 374:20,
374:21, 480:22,
481:6, 481:10,
482:1, 509:12,
509:19, 509:21,
512:2, 513:6,
513:10, 513:17,
527:2, 528:21,
529:12, 529:16,
529:21, 529:23,
530:6, 530:16,
533:13, 534:16,
534:18, 537:10,
538:17, 539:18,
539:22, 540:1,
540:21, 542:5,
543:12, 545:6,
547:11, 549:18,
549:23, 551:6,
551:11, 551:20,
552:9, 552:14,
552:15, 552:19,
552:20, 553:9,
553:20, 554:18,
554:23, 555:4,
555:24, 559:1,
559:24, 563:14,
563:21, 564:7,
569:11, 577:8,
577:9, 577:17,
585:10, 585:23,
586:2, 586:11,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

587:19, 588:7,
588:23, 591:19,
592:14, 600:17,
601:5, 602:24,
605:8, 605:10,
634:24, 651:1,
660:7, 666:15,
686:5, 686:7
opinions [15] - 506:4,
534:24, 568:21,
569:8, 573:9,
578:17, 578:24,
603:9, 603:22,
607:11, 607:15,
633:4, 633:9,
633:22, 650:16
opportunity [8] -
391:10, 392:12,
394:15, 395:22,
524:6, 616:2, 616:8,
616:18
opposed [6] - 366:4,
442:13, 498:12,
550:6, 644:7, 666:20
optic [1] - 490:4
optimization [1] -
644:12
order [22] - 363:13,
388:12, 398:20,
399:4, 405:23,
407:1, 407:6,
408:11, 446:6,
508:6, 508:13,
520:9, 522:9,
534:14, 541:5,
559:13, 561:19,
562:24, 568:22,
572:24, 595:9,
605:12
ordinary [2] - 684:1,
684:7
organization [3] -
502:10, 626:15,
658:15
organized [1] - 626:14
organizes [2] - 670:6,
673:5
original [2] - 372:23,
372:24
originally [2] - 611:8,
611:9
oRRICK [1] - 349:3
otherwise [4] -
366:19, 427:2,
566:2, 650:11
ourselves [1] - 424:10
outcome [1] - 653:16
outline [2] - 434:21,
655:14
outside [3] - 382:9,

445:10, 544:8
outweighs [1] -
650:16
overall [2] - 620:24,
660:21
overcome [1] - 625:20
overhead [5] - 625:5,
625:14, 626:1,
626:17, 662:7
overnight [1] - 363:19
outrule [5] - 445:16,
544:23, 583:1,
643:5, 645:22
outruled [4] - 380:22,
458:2, 546:12, 549:8
overtake [2] - 374:8,
374:18
overview [4] - 553:2,
553:8, 655:21, 660:4
own [9] - 414:22,
428:21, 439:24,
550:3, 551:7,
630:16, 639:18,
659:16, 674:17
owned [3] - 446:15,
483:8, 486:13
owners [1] - 589:21
p [1] - 582:21
p.m [3] - 531:8,
532:24, 691:16
P2 [16] - 494:12,
497:2, 497:3, 497:7,
514:7, 514:9,
514:11, 514:12,
515:8, 515:9,
515:24, 520:17,
521:11, 536:8
Pacific [2] - 361:20,
362:6
pack [1] - 681:23
package [1] - 485:14
packed [1] - 682:1
page [45] - 360:12,
377:8, 377:9,
378:13, 378:20,
378:24, 379:4,
379:18, 379:20,
384:5, 437:16,
452:13, 459:15,
463:18, 467:23,
610:1, 626:23,
661:9, 661:18,
666:9, 672:6, 673:1,
673:8, 673:11,
674:14, 674:15,
674:19, 676:19,
677:7, 680:9,
680:17, 680:19,
681:12, 681:14,
681:15, 682:1

682:4, 682:17,
682:19, 683:3,
684:17, 684:20,
685:5, 686:1
Page [1] - 394:6
Pages [1] - 692:10
pages [22] - 508:13,
670:23, 672:1,
672:2, 672:5, 672:7,
672:9, 672:23,
673:18, 673:21,
673:22, 674:3,
675:17, 675:18,
676:16, 676:19,
678:11, 684:21,
685:21, 685:22,
686:1
paid [10] - 440:19,
440:24, 441:13,
441:15, 441:17,
441:24, 565:20,
616:2, 653:11,
653:12
paper [24] - 434:19,
434:20, 434:22,
435:3, 435:24,
449:10, 449:13,
450:8, 450:21,
451:3, 451:12,
451:14, 452:5,
452:9, 452:10,
452:14, 452:24,
453:4, 453:8,
453:19, 453:21,
568:2, 641:8
paperclip [2] - 498:5
papers [2] - 449:9,
638:21
paragraph [13] -
579:6, 579:7, 579:8,
579:9, 579:15,
580:20, 597:1,
597:4, 597:14,
628:7, 628:14,
639:12
paragraphs [1] - 580:5
parallel [7] - 429:6,
625:9, 626:8,
626:16, 629:2,
629:24, 645:2
parameters [3] -
419:8, 419:10,
419:14
parentheses [1] -
379:6
parities [1] - 673:17
parity [27] - 620:20,
620:24, 621:3,
621:5, 621:14,
621:21, 622:7,

622:13, 623:6,
625:5, 625:11,
627:14, 640:3,
640:11, 641:24,
642:7, 658:11,
662:17, 662:20,
662:23, 672:24,
673:6, 673:10,
673:11, 673:18,
676:8, 676:12
parody [9] - 647:23,
656:20, 656:21,
657:8, 676:18,
676:20, 676:24,
677:10, 687:10
part [36] - 351:17,
352:23, 384:6,
406:3, 422:8, 475:5,
486:4, 486:13,
487:23, 495:3,
500:10, 500:11,
501:1, 507:11,
514:15, 521:15,
521:17, 535:5,
572:10, 607:9,
617:18, 617:20,
627:3, 654:5,
654:24, 658:5,
658:10, 661:22,
675:4, 677:23,
681:4, 684:14,
685:13, 687:9,
687:15
partially [1] - 486:13
participated [1] -
353:22
particular [30] -
421:18, 425:20,
427:12, 485:19,
489:11, 494:9,
500:23, 557:21,
602:9, 605:17,
607:9, 610:20,
613:2, 631:5, 639:2,
660:18, 664:19,
665:9, 665:23,
669:4, 669:5,
671:12, 673:21,
677:10, 680:21,
681:15, 682:3,
683:14, 684:24,
685:6
particularly [3] -
362:4, 423:14, 644:6
parties [9] - 353:3,
364:20, 480:9,
500:7, 503:21,
503:24, 507:21,
515:16, 534:21
partner [2] - 447:3,

447:9
parts [6] - 389:10,
491:5, 526:12,
658:5, 662:14,
662:15
pass [2] - 564:17,
636:17
passed [2] - 397:20,
485:8
passing [1] - 485:15
past [8] - 357:21,
365:17, 388:14,
393:13, 450:2,
565:9, 643:1, 646:9
Pat [1] - 394:4
patent [139] - 358:3,
358:9, 358:17,
360:20, 382:8,
383:24, 384:10,
384:15, 384:18,
384:22, 385:8,
385:15, 405:17,
406:7, 406:8,
411:13, 411:20,
417:20, 418:6,
419:20, 420:6,
423:12, 428:23,
438:2, 448:17,
449:1, 450:12,
454:15, 454:23,
454:24, 455:3,
455:4, 460:22,
461:1, 461:2, 461:8,
462:17, 470:22,
471:4, 480:5, 480:6,
480:10, 480:12,
480:16, 480:18,
480:19, 480:23,
481:3, 481:5, 481:7,
482:2, 499:13,
499:14, 499:16,
499:18, 499:20,
500:3, 500:13,
501:2, 501:5,
503:14, 506:21,
507:11, 507:17,
509:14, 509:24,
530:1, 530:4,
530:13, 530:17,
531:23, 532:6,
533:13, 533:15,
533:19, 534:17,
534:19, 534:22,
535:3, 535:4, 535:6,
535:23, 536:14,
538:9, 538:21,
538:22, 539:4,
539:12, 540:3,
540:8, 541:1, 542:2,
542:4, 552:13,

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|--|--|---|---|--|
| <p>552:17, 570:11, 570:12, 570:22, 571:2, 571:12, 592:4, 606:2, 609:8, 609:14, 609:17, 610:1, 610:12, 610:17, 611:6, 613:16, 617:12, 639:1, 639:7, 639:8, 639:14, 639:17, 639:19, 639:20, 639:23, 640:16, 640:18, 640:22, 641:17, 644:3, 644:6, 646:10, 646:19, 648:7, 648:10, 649:7, 653:9, 658:6, 660:8, 663:13, 663:19, 663:24</p> <p>Patent [16] - 408:17, 409:7, 448:18, 470:8, 470:16, 551:22, 552:11, 552:17, 617:12, 637:5, 637:8, 637:22, 657:14, 657:23, 686:9, 688:1</p> <p>patented [6] - 356:15, 357:24, 380:19, 381:4, 530:14, 610:22</p> <p>Patents [3] - 551:3, 551:13, 556:12</p> <p>patents [71] - 354:15, 355:24, 356:1, 358:3, 358:13, 358:15, 359:13, 361:19, 364:12, 384:18, 389:3, 389:4, 389:18, 392:15, 392:16, 392:17, 392:19, 392:21, 392:24, 404:10, 405:15, 405:17, 408:17, 410:19, 410:20, 410:23, 423:12, 426:11, 426:16, 444:12, 444:14, 445:2, 460:9, 460:11, 460:12, 470:11, 472:22, 473:1, 476:5, 478:22, 479:23, 479:24, 480:3, 480:8, 482:1, 499:6, 499:7, 499:12, 500:18, 500:20, 502:19, 503:13, 533:24, 534:9,</p> | <p>534:13, 537:23, 551:2, 551:9, 552:21, 553:10, 555:1, 556:15, 556:16, 589:13, 591:17, 592:6, 611:2, 611:3</p> <p>path [1] - 620:3</p> <p>Patterson [8] - 411:19, 413:10, 413:21, 415:11, 415:18, 415:23, 416:11, 465:7</p> <p>PAUL [1] - 348:22</p> <p>pay [2] - 394:24, 395:6</p> <p>paying [1] - 395:4</p> <p>PC [1] - 505:2</p> <p>PC's [1] - 490:2</p> <p>peak [8] - 562:3, 562:9, 562:24, 596:12, 600:5, 600:7, 602:8, 602:13</p> <p>peaks [7] - 560:12, 560:18, 561:9, 561:23, 561:24, 562:6, 562:8</p> <p>peer [1] - 568:3</p> <p>penalty [1] - 629:12</p> <p>people [25] - 391:12, 394:15, 395:19, 396:6, 397:5, 399:24, 400:16, 411:2, 417:15, 429:22, 449:22, 474:15, 474:16, 474:18, 474:20, 474:21, 477:19, 490:9, 490:11, 493:7, 501:12, 617:6, 634:19, 650:24, 667:3</p> <p>per [1] - 423:15</p> <p>percent [33] - 397:10, 397:17, 403:7, 403:8, 403:17, 403:19, 404:2, 404:3, 404:4, 465:24, 466:5, 503:3, 548:18, 548:19, 549:2, 549:10, 558:20, 559:17, 559:21, 562:11, 562:15, 562:18, 562:22, 563:7, 566:6, 595:8, 595:15, 599:6, 601:7, 602:1, 602:10, 603:1</p> <p>percentage [1] - 560:13</p> | <p>percentages [1] - 562:16</p> <p>perform [12] - 407:6, 506:22, 513:14, 513:15, 518:18, 519:5, 541:9, 546:9, 606:4, 606:19, 606:21, 607:1</p> <p>performance [22] - 373:15, 407:23, 419:6, 419:11, 492:7, 614:10, 614:11, 614:21, 615:3, 615:5, 619:7, 619:22, 623:4, 624:5, 625:20, 625:24, 626:21, 628:3, 628:16, 629:12, 659:9, 662:9</p> <p>performed [4] - 375:24, 541:5, 583:8, 588:15</p> <p>performing [9] - 449:2, 453:14, 498:11, 520:8, 529:3, 571:8, 587:4, 595:9, 615:8</p> <p>performs [8] - 505:9, 519:8, 519:10, 528:17, 575:19, 584:7, 587:17, 603:12</p> <p>perhaps [2] - 386:10, 386:17</p> <p>period [6] - 357:19, 383:17, 386:13, 418:1, 617:15, 619:2</p> <p>periods [1] - 616:20</p> <p>permitted [1] - 352:21</p> <p>person [13] - 394:12, 411:23, 459:4, 477:11, 477:13, 477:17, 477:19, 477:23, 478:3, 478:4, 624:20, 684:1, 690:10</p> <p>personal [3] - 357:23, 611:7, 635:14</p> <p>perspective [1] - 365:2</p> <p>phase [2] - 351:3, 352:5</p> <p>PhD [5] - 390:16, 390:17, 390:19, 392:1, 653:23</p> <p>phones [1] - 411:11</p> <p>photo [4] - 421:15, 423:4, 466:8, 470:1</p> <p>photograph [10] - 419:16, 420:2</p> | <p>420:23, 421:4, 421:7, 421:17, 422:1, 422:17, 422:22, 455:18</p> <p>photographs [5] - 418:8, 420:14, 424:2, 428:14, 455:16</p> <p>photos [25] - 417:11, 417:17, 417:22, 417:23, 418:2, 420:20, 424:5, 424:7, 424:22, 428:20, 462:23, 464:1, 464:21, 465:18, 467:5, 467:12, 468:14, 468:23, 469:4, 469:16, 469:19, 470:4, 470:20, 471:1, 475:22</p> <p>physical [8] - 630:13, 630:19, 645:17, 665:3, 683:19, 684:3, 684:8, 685:6</p> <p>physically [3] - 484:20, 619:10, 628:20</p> <p>pick [4] - 447:15, 495:4, 567:19, 567:23</p> <p>picked [8] - 567:20, 567:21, 599:2, 599:7, 599:17, 599:20, 599:21, 637:21</p> <p>picking [1] - 601:13</p> <p>picture [6] - 422:18, 422:19, 621:1, 622:10, 639:1, 669:9</p> <p>pictures [1] - 622:9</p> <p>piece [7] - 408:13, 582:19, 622:5, 628:10, 629:3, 629:4, 688:22</p> <p>pieces [7] - 386:3, 429:11, 465:2, 519:1, 621:24, 628:20, 628:23</p> <p>place [2] - 426:19, 626:3</p> <p>placed [4] - 576:19, 576:23, 577:3, 577:4</p> <p>placement [1] - 397:8</p> <p>places [1] - 495:2</p> <p>plainer [1] - 504:9</p> <p>plaintiff [2] - 531:15, 569:2</p> <p>Plaintiff [1] - 689:20</p> <p>Plaintiffs [11] - 689:22</p> | <p>Plaintiffs [2] - 348:5, 349:4</p> <p>plan [4] - 374:9, 374:18, 483:15, 667:4</p> <p>planner [2] - 600:23, 602:23</p> <p>planning [8] - 485:23, 486:2, 560:10, 561:18, 596:13, 598:22, 599:18, 603:6</p> <p>plant [2] - 436:16, 436:22</p> <p>plausible [1] - 413:7</p> <p>players [2] - 395:16, 398:21</p> <p>pleasure [1] - 478:20</p> <p>plurality [7] - 507:5, 535:10, 535:17, 536:1, 536:15, 627:22, 672:19</p> <p>plus [2] - 374:10, 686:16</p> <p>point [28] - 354:22, 358:21, 378:2, 403:3, 416:20, 432:3, 434:24, 435:2, 440:3, 440:8, 446:14, 452:4, 459:22, 475:11, 521:3, 525:14, 558:10, 558:11, 616:5, 623:9, 624:8, 641:20, 652:3, 652:5, 679:4, 679:16, 680:17, 684:6</p> <p>pointed [2] - 359:7, 571:21</p> <p>pointer [2] - 527:14, 573:16</p> <p>points [2] - 383:11, 655:17</p> <p>POPPE [36] - 349:3, 608:6, 608:17, 608:21, 609:19, 609:23, 631:11, 632:24, 634:23, 635:5, 636:9, 641:13, 643:3, 645:21, 646:11, 647:7, 647:10, 649:2, 649:4, 650:2, 651:16, 651:18, 652:5, 652:12, 652:13, 655:6, 655:12, 661:7, 661:12, 663:1, 663:6, 669:13,</p> |
|--|--|---|---|--|

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

669:18, 674:21,
675:2, 688:5
poppe [1] - 688:3
Poppe [6] - 608:2,
608:7, 608:19,
636:11, 652:2,
689:11
portion [6] - 378:14,
627:12, 628:2,
661:14, 684:11,
684:24
portions [2] - 672:9,
677:24
portray [1] - 366:5
portrayed [1] - 366:14
position [8] - 381:17,
381:21, 439:15,
440:23, 445:6,
612:13, 613:19,
615:14
positions [2] - 664:10,
665:6
possession [1] -
445:23
possible [4] - 381:8,
469:21, 530:12,
594:2
possibly [2] - 412:22,
645:8
Post [3] - 483:9,
483:14, 488:17
post [3] - 545:24,
548:21, 688:18
post-process [1] -
548:21
poster [1] - 663:20
posts [4] - 545:6,
545:19, 546:15,
550:7
potential [2] - 394:8,
395:5
potentially [3] -
518:20, 547:22,
619:13
practice [12] - 358:17,
425:13, 426:21,
461:5, 551:9,
551:21, 552:10,
552:16, 552:21,
553:10, 554:19,
589:12
practiced [1] - 555:1
practices [1] - 591:16
pre [1] - 649:7
pre-existed [1] - 649:7
precisely [1] - 357:5
precision [1] - 410:21
predict [1] - 486:6
predicted [1] - 407:18
prefer [2] - 364:24,

396:14
preferable [1] - 651:14
prejudicial [3] -
351:22, 436:13,
650:17
preliminary [11] -
502:21, 502:24,
503:1, 503:2, 503:6,
503:9, 515:13,
536:20, 536:21,
537:2, 670:23
preparation [2] -
524:8, 524:13
prepared [10] -
379:21, 417:22,
419:17, 420:3,
420:11, 578:12,
655:14, 655:16,
664:2, 681:1
prepares [1] - 375:20
present [6] - 435:17,
523:17, 552:7,
568:24, 664:23,
666:3
presentation [8] -
434:20, 435:4,
451:12, 452:5,
523:14, 550:17,
572:8, 634:2
presentations [2] -
550:8, 550:12
presented [10] -
360:1, 379:11,
434:19, 435:17,
450:22, 452:6,
523:21, 572:10,
641:3
preserve [1] - 621:4
president [1] - 493:8
prestigious [1] - 393:9
presumably [1] -
434:7
pretty [12] - 428:10,
448:12, 612:10,
617:4, 618:2, 619:9,
623:4, 626:6, 631:3,
631:7, 634:10, 651:8
prevent [2] - 365:21,
501:21
previous [2] - 449:5
previously [7] -
468:22, 510:12,
512:18, 516:7,
521:20, 523:4,
536:16
price [5] - 357:7,
398:24, 486:21,
492:6, 543:21
primary [11] - 351:12,
370:3, 442:14

442:24, 443:2,
443:9, 444:15,
591:5, 613:9, 618:13
prime [1] - 619:4
Princeton [8] - 383:4,
383:6, 383:13,
392:2, 394:22,
456:22, 476:15,
476:22
principle [1] - 621:5
printed [1] - 378:20
probabilistic [1] -
536:17
probative [1] - 650:15
problem [20] - 389:7,
395:20, 396:19,
399:20, 415:3,
434:11, 437:1,
437:15, 452:18,
498:13, 501:9,
501:10, 501:13,
502:4, 502:18,
623:2, 623:18,
624:21, 625:2, 631:5
problematic [1] -
625:16
problems [13] -
396:20, 398:7,
448:22, 452:11,
453:20, 453:21,
501:3, 501:6,
501:17, 623:4,
624:5, 625:21, 634:8
procedures [1] -
418:19
proceed [7] - 382:19,
438:18, 489:1,
564:20, 607:21,
636:8, 655:11
proceedings [2] -
451:4, 664:6
process [38] - 409:3,
495:10, 495:15,
497:3, 497:24,
513:20, 514:1,
514:20, 516:1,
517:5, 520:14,
521:3, 521:16,
523:17, 537:22,
538:8, 539:17,
540:7, 540:15,
540:23, 540:24,
548:21, 571:22,
572:1, 573:12,
573:18, 576:14,
579:11, 588:8,
593:7, 607:14,
622:16, 623:15,
623:17, 630:21,
634:3, 663:16, 685:8

processed [1] - 596:5
processing [3] -
593:4, 593:9, 630:16
processor [1] - 494:23
produce [2] - 396:6,
397:9
produced [2] - 487:21,
505:23
product [115] - 351:12,
351:19, 355:24,
356:4, 356:8,
356:20, 357:8,
357:10, 357:24,
359:12, 361:18,
362:4, 367:21,
368:6, 368:11,
369:1, 369:8, 371:4,
371:10, 373:7,
373:21, 374:1,
374:16, 374:22,
381:11, 387:8,
387:10, 387:23,
388:4, 389:8,
394:13, 395:21,
395:23, 400:2,
400:8, 400:12,
400:18, 400:20,
402:11, 403:1,
403:5, 403:17,
404:1, 405:20,
409:3, 409:24,
411:5, 419:15,
422:10, 425:5,
425:7, 425:15,
425:23, 426:9,
429:12, 429:19,
431:12, 431:17,
442:16, 442:17,
442:20, 443:19,
443:21, 443:24,
444:8, 446:8, 449:6,
449:8, 451:15,
452:12, 486:15,
487:4, 487:24,
504:6, 504:19,
507:2, 528:15,
530:14, 538:20,
543:21, 544:1,
544:22, 545:15,
563:9, 569:17,
591:9, 591:16,
592:3, 605:9,
606:10, 606:13,
613:3, 613:5, 613:6,
616:15, 617:18,
617:19, 617:21,
619:6, 631:5,
643:12, 659:6,
659:17, 660:4,
660:10, 660:11,

660:16, 660:18,
663:17, 663:18,
669:12, 670:2,
685:1, 686:8
Products [2] - 372:12,
375:4
products [108] -
351:10, 351:18,
351:20, 356:14,
358:9, 358:13,
362:15, 387:1,
387:4, 387:22,
388:2, 389:16,
401:14, 404:7,
404:9, 409:9,
409:10, 409:13,
442:16, 443:5,
473:3, 473:21,
474:12, 474:18,
474:20, 474:21,
481:12, 503:21,
504:17, 505:5,
505:8, 505:19,
509:13, 509:22,
512:3, 512:4, 513:8,
513:11, 521:17,
529:15, 529:22,
529:24, 530:8,
530:11, 530:18,
533:24, 534:2,
537:11, 538:14,
538:19, 542:14,
543:4, 544:10,
545:8, 547:6, 550:3,
550:16, 551:7,
551:8, 551:12,
551:14, 551:17,
551:21, 551:23,
552:3, 552:7,
552:10, 552:16,
552:21, 552:23,
553:10, 554:12,
554:15, 554:19,
555:2, 555:3, 556:2,
556:13, 556:20,
557:10, 557:12,
557:15, 557:18,
559:12, 559:20,
559:22, 560:5,
560:16, 563:8,
566:4, 567:1, 567:4,
569:12, 585:7,
589:12, 589:16,
590:3, 590:8,
600:15, 610:19,
610:21, 613:12,
613:24, 614:6,
633:5, 639:18,
643:1, 659:16
products' [1] - 556:16
professionals [2] -

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|--|---|---|--|---|
| <p>437:3, 454:4 Professor [1] - 350:12 professor [12] - 350:13, 383:3, 383:5, 394:22, 476:14, 476:22, 652:18, 652:24, 653:2, 654:14, 655:2, 690:9 proffer [1] - 655:7 proffered [1] - 352:2 profits [2] - 356:7, 361:24 program [11] - 386:12, 487:1, 504:6, 504:10, 504:12, 504:19, 507:1, 514:24, 526:12, 566:16, 606:10 programing [1] - 566:15 programming [2] - 518:24, 527:20 programs [2] - 390:16, 573:5 progressed [1] - 381:13 progressively [1] - 373:16 project [6] - 442:20, 444:1, 444:3, 453:17, 561:2, 561:8 projected [1] - 601:2 promising [1] - 355:17 promoted [1] - 613:21 proof [1] - 569:3 proper [1] - 352:10 proposed [6] - 535:1, 537:17, 537:20, 542:13, 542:16, 563:16 proposing [1] - 374:17 protect [4] - 387:4, 617:18, 617:23, 621:10 protected [1] - 618:9 protecting [2] - 610:23, 617:13 protection [1] - 622:15 protects [1] - 621:20 prototype [3] - 426:24, 429:7, 429:9 proud [1] - 472:20 proved [1] - 409:8 provide [5] - 397:22, 561:19, 595:19, 603:1, 657:8 provided [16] - 371:8,</p> | <p>383:20, 507:9, 509:3, 510:14, 512:19, 537:5, 558:5, 559:5, 560:4, 562:4, 565:7, 585:11, 585:14, 602:4, 687:24 provides [4] - 369:9, 659:8, 659:9, 662:2 province [1] - 390:7 proving [1] - 619:6 PTO [1] - 647:1 PTX [21] - 384:21, 418:12, 422:3, 423:9, 424:13, 424:21, 454:20, 455:21, 609:12, 609:20, 626:24, 657:21, 661:8, 663:2, 666:4, 666:24, 669:14, 672:16, 674:15, 674:16, 674:22 PTX-1 [1] - 383:21 PTX-31 [2] - 545:21, 546:5 PTX-8 [1] - 430:6 PTX-9 [1] - 466:8 Public [1] - 692:9 public [8] - 390:8, 390:9, 397:23, 402:17, 432:4, 432:8, 440:2, 550:7 publications [2] - 640:17, 640:19 published [1] - 568:2 pull [13] - 418:9, 418:12, 421:2, 572:6, 593:22, 594:17, 594:24, 617:24, 624:15, 636:10, 666:4, 675:3, 675:13 pulled [2] - 594:19, 632:8 purchase [1] - 446:7 purchased [1] - 552:4 Pure [212] - 348:7, 351:11, 351:21, 352:17, 352:24, 354:2, 360:7, 365:20, 365:21, 366:5, 366:15, 373:1, 373:14, 374:11, 374:19, 380:18, 381:3, 434:5, 436:9, 446:21, 447:2, 447:4, 447:8, 447:24, 448:4,</p> | <p>448:7, 479:23, 480:10, 481:9, 481:12, 485:14, 503:17, 503:21, 503:24, 504:17, 505:5, 505:7, 505:19, 505:22, 505:23, 507:1, 509:13, 509:22, 510:2, 510:4, 512:7, 512:9, 513:2, 513:8, 513:10, 513:13, 513:20, 513:21, 513:24, 514:19, 515:19, 516:1, 518:18, 520:7, 520:14, 520:24, 521:1, 521:16, 522:3, 522:13, 523:4, 523:13, 523:16, 525:18, 526:5, 527:23, 528:5, 528:8, 528:22, 529:14, 529:21, 529:23, 530:7, 533:23, 534:6, 535:1, 537:17, 537:19, 537:20, 538:6, 538:11, 538:12, 538:17, 539:16, 540:5, 540:6, 540:14, 540:17, 540:18, 540:21, 541:22, 541:24, 542:12, 542:13, 543:3, 544:3, 544:8, 545:4, 545:8, 545:14, 546:23, 547:5, 548:3, 548:5, 548:16, 548:23, 549:14, 550:2, 550:5, 550:8, 550:16, 552:18, 555:18, 556:17, 556:19, 556:24, 557:9, 557:11, 557:12, 558:15, 559:11, 559:18, 559:20, 563:6, 563:8, 563:11, 563:15, 563:17, 563:21, 564:3, 569:12, 572:19, 575:12, 581:1, 587:16, 588:9, 591:6, 593:14, 594:3, 594:12, 594:14, 594:19, 595:19, 600:11,</p> | <p>602:4, 602:18, 602:24, 603:21, 604:15, 605:8, 605:12, 607:10, 627:10, 633:1, 633:7, 660:4, 660:15, 660:23, 660:24, 661:3, 661:14, 661:21, 661:24, 664:10, 665:2, 666:18, 667:2, 669:10, 669:23, 670:1, 670:5, 670:12, 671:9, 671:10, 671:12, 671:16, 673:5, 674:8, 674:10, 674:16, 676:2, 676:22, 677:4, 678:19, 679:7, 680:4, 680:8, 680:10, 680:12, 680:15, 681:11, 681:18, 681:19, 682:8, 682:12, 682:15, 682:21, 683:9, 685:4, 685:7, 686:6, 686:7 Pure's [4] - 571:22, 580:7, 585:6, 593:1 purer [1] - 429:12 Purity [47] - 373:2, 504:21, 504:23, 505:8, 505:18, 506:15, 506:19, 508:6, 509:12, 513:7, 515:1, 515:3, 515:17, 515:22, 516:2, 517:3, 517:6, 517:9, 517:14, 517:19, 517:21, 517:23, 518:2, 518:8, 520:18, 520:21, 521:21, 523:8, 524:1, 525:2, 525:3, 525:24, 526:22, 533:13, 542:24, 574:11, 575:2, 575:12, 575:16, 575:17, 576:5, 576:7, 577:2, 603:11, 606:17, 606:20, 684:19 purpose [2] - 395:10, 504:12 purposes [2] - 359:11, 657:16 pursue [1] - 395:11 push [1] - 631:14 pushing [1] - 381:7</p> | <p>put [42] - 357:2, 359:19, 362:17, 405:15, 408:4, 409:6, 410:19, 410:22, 411:3, 421:17, 426:4, 426:15, 454:21, 461:12, 466:7, 471:19, 491:13, 506:23, 510:6, 522:2, 525:19, 529:20, 533:22, 537:10, 539:23, 542:9, 557:14, 578:17, 582:20, 584:1, 585:24, 594:8, 597:16, 606:1, 620:2, 623:3, 632:20, 633:23, 638:9, 642:7, 647:22, 678:14 putting [4] - 353:15, 521:2, 634:6, 650:17 qualifications [1] - 483:3 quality [1] - 397:14 quarter [2] - 381:12, 619:17 quarters [1] - 381:22 questioning [1] - 646:13 questions [18] - 380:1, 380:9, 410:17, 417:14, 430:23, 432:15, 434:12, 437:9, 475:22, 478:12, 534:1, 539:20, 603:8, 605:7, 605:21, 607:17, 641:18, 648:23 quick [1] - 475:21 quicker [1] - 389:21 quickly [13] - 371:20, 387:13, 393:23, 400:22, 401:2, 404:15, 475:18, 498:9, 503:5, 503:10, 511:6, 511:16, 614:24 quite [4] - 418:5, 580:17, 626:11, 689:16 quotes [2] - 650:9, 689:23 quoting [1] - 457:24 RAID [51] - 620:8, 620:14, 620:15, 622:12, 622:16, 622:19, 623:3,</p> |
|--|---|---|--|---|

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

623:5, 623:11,
623:23, 625:3,
625:4, 625:11,
626:16, 626:20,
627:15, 627:17,
627:19, 628:5,
628:16, 638:9,
638:10, 638:11,
638:13, 638:17,
638:21, 639:18,
639:22, 640:3,
640:9, 640:11,
640:12, 640:14,
647:5, 647:13,
648:12, 649:8,
649:17, 649:18,
649:19, 655:3,
655:5, 655:8,
655:21, 656:6,
658:18, 659:2,
659:8, 662:21
RAID-3D [3] - 660:22,
661:1, 662:1
raise [1] - 363:10
raised [4] - 353:17,
355:21, 365:2,
633:15
raising [2] - 355:2,
364:23
ram [3] - 643:20,
644:11
ran [2] - 557:15,
602:21
random [1] - 635:13
range [4] - 567:1,
567:4, 690:20,
690:22
ranging [1] - 431:14
rate [8] - 407:15,
407:17, 407:22,
440:20, 441:17,
441:21, 441:22,
441:24
rather [5] - 478:6,
508:1, 534:3, 591:5,
599:5
ratio [7] - 406:20,
406:24, 407:3,
408:23, 409:16,
410:5
reached [3] - 603:22,
660:12, 663:13
reaching [8] - 506:4,
509:12, 509:19,
552:20, 553:9,
555:24, 607:11,
607:14
read [38] - 397:2,
397:3, 406:8,
418:14, 434:20,

435:17, 452:8,
452:10, 460:3,
460:22, 461:4,
461:8, 461:11,
461:15, 461:19,
462:1, 462:3, 462:6,
471:16, 471:18,
472:6, 472:10,
472:13, 472:14,
507:3, 510:8, 511:6,
511:16, 512:13,
549:9, 555:20,
568:16, 633:6,
638:22, 651:13,
680:3
readable [2] - 504:7,
504:13
reading [4] - 462:2,
651:3, 683:13, 684:2
reads [1] - 625:12
ready [4] - 433:8,
532:13, 607:20,
688:13
real [5] - 475:21,
493:5, 502:8,
570:24, 615:22
realize [2] - 658:24,
662:6
really [25] - 351:7,
351:15, 354:17,
356:19, 361:15,
394:18, 434:12,
435:24, 464:3,
465:19, 475:9,
476:24, 524:10,
559:9, 577:23,
614:5, 614:17,
620:1, 623:7,
623:24, 624:9,
625:2, 626:12,
626:13, 681:5
reason [10] - 395:13,
396:15, 407:10,
411:5, 428:1,
437:21, 507:24,
539:7, 583:17,
625:18
reasonable [6] -
356:7, 532:9,
561:17, 633:8,
635:6, 690:3
reasons [7] - 350:22,
351:14, 529:12,
588:24, 675:11,
676:11, 682:21
rebuild [2] - 629:6,
629:9
recalling [1] - 360:19
receive [2] - 483:11,
516:23

received [14] - 372:1,
375:13, 376:14,
392:1, 392:20,
393:1, 393:6,
411:21, 535:21,
561:7, 605:5, 632:6,
653:20
receives [2] - 491:11,
516:23
receiving [3] - 392:10,
507:4, 535:9
recent [23] - 517:16,
517:17, 517:18,
517:22, 517:24,
518:5, 518:7,
519:10, 523:18,
524:20, 524:22,
525:5, 541:7, 572:4,
573:18, 573:24,
574:12, 574:17,
574:22, 574:24,
575:3, 575:14
recently [1] - 517:1
recess [4] - 366:23,
367:1, 532:11,
691:14
recessed [1] - 691:16
recited [1] - 535:22
recognition [2] -
483:12, 483:15
recognitions [1] -
393:13
recognize [9] - 384:4,
384:7, 385:7,
424:24, 431:7,
431:8, 661:13,
666:7, 669:8
recognized [2] -
394:10, 482:10
recognizing [1] -
483:16
recollection [6] -
412:21, 414:23,
428:21, 431:15,
468:4, 671:15
recommendations [1]
- 600:24
record [14] - 362:5,
383:2, 401:18,
411:9, 424:6,
454:23, 459:19,
460:4, 477:11,
479:1, 608:9,
632:23, 651:4, 692:9
recorded [1] - 468:5
recording [1] - 487:9
records [1] - 457:11
recover [4] - 621:10,
621:21, 656:15,
687:12

Recovery [2] - 641:2,
641:9
recovery [1] - 396:16
recruit [1] - 397:4
recruited [1] - 616:15
recruiting [2] - 411:2,
487:1
rectangle [1] - 669:2
rectangles [2] - 668:2,
668:6
red [1] - 672:3
redesign [1] - 538:7
redesigned [1] -
537:21
REDIRECT [3] - 380:4,
475:19, 601:22
redirect [6] - 352:7,
363:22, 380:3,
475:17, 601:19,
649:1
reduce [8] - 388:13,
406:16, 408:7,
499:3, 502:3,
619:19, 662:8,
681:21
reduced [2] - 407:7,
410:15
reduces [1] - 502:15
reducing [2] - 454:2,
477:21
reduction [4] - 369:23,
369:24, 370:4,
370:17
redundancy [2] -
615:11, 656:18
redundant [7] - 408:9,
408:15, 409:1,
410:1, 501:21,
656:8, 656:12
Redundant [2] -
641:2, 641:9
refer [8] - 389:1,
414:7, 415:7, 467:7,
612:22, 671:5,
679:24, 683:8
reference [11] -
413:15, 434:7,
526:16, 627:21,
662:16, 662:19,
662:22, 679:16,
679:19, 680:16,
684:2
references [3] - 434:6,
435:7, 581:17
referred [7] - 412:9,
414:3, 421:3, 640:8,
650:12, 660:22,
687:19
referring [6] - 409:11,
506:16, 655:18,

661:22, 681:3, 683:3
refers [4] - 519:21,
630:7, 656:9, 656:12
refine [1] - 624:8
reflect [5] - 425:10,
537:18, 575:6,
575:9, 575:11
reflecting [1] - 532:15
refresh [1] - 431:15
refrigerator [1] -
619:11
regard [2] - 669:20,
671:14
regarding [2] -
660:20, 666:15
regardless [1] -
600:19
regards [1] - 661:1
region [7] - 628:8,
628:22, 668:9,
668:13, 668:19,
671:1, 685:18
regions [15] - 628:12,
628:21, 648:16,
658:22, 667:14,
667:21, 668:4,
668:6, 669:1, 670:4,
670:7, 671:4,
671:22, 678:3, 678:9
Registered [1] - 692:7
reinforces [1] - 544:9
rejoined [2] - 616:11,
616:13
rejoining [1] - 642:20
relate [13] - 389:2,
423:11, 482:3,
484:23, 485:7,
488:15, 499:5,
511:11, 536:2,
543:12, 544:13,
653:8, 669:19
related [9] - 350:19,
417:15, 603:15,
603:17, 605:11,
610:17, 615:22,
627:13, 628:15
relates [9] - 486:10,
500:7, 535:11,
536:19, 544:19,
610:18, 617:13,
628:3, 679:4
relating [3] - 356:20,
487:12, 627:15
relation [1] - 618:23
relationship [3] -
420:3, 667:19,
670:10
relatively [4] - 378:5,
492:8, 541:10,
625:10

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

| | | | | |
|--|---|--|---|--|
| release [2] - 371:4, 371:10 | 459:12, 511:10, 524:24, 545:2 | 374:1, 670:13 | 613:23, 614:1, 617:19 | 606:19, 606:22, 607:1, 607:5 |
| released [4] - 370:15, 371:15, 427:13, 551:18 | reminded [1] - 354:8 | represents [3] - 389:10, 565:12, 656:19 | responsive [1] - 465:9 | returns [13] - 527:10, 527:23, 528:3, 528:23, 529:4, 529:5, 581:22, 583:19, 583:20, 588:1, 588:2, 588:4, 604:23 |
| relevance [10] - 351:22, 352:13, 355:3, 355:6, 356:3, 359:11, 437:6, 438:5, 641:13 | remote [1] - 397:6 | request [1] - 353:10 | rest [7] - 403:4, 429:11, 532:1, 546:11, 665:8, 689:23, 690:16 | revenue [13] - 400:9, 400:22, 400:24, 401:13, 401:19, 401:22, 402:21, 402:24, 403:6, 403:16, 409:11, 409:14 |
| relevant [11] - 354:14, 354:19, 356:6, 361:16, 366:17, 417:18, 436:10, 545:6, 666:15, 679:16, 680:13 | remove [5] - 481:21, 541:18, 542:23, 593:11, 650:23 | require [2] - 541:11, 601:11 | restate [1] - 380:23 | revenues [7] - 351:18, 351:19, 356:11, 356:14, 357:7, 357:23, 404:5 |
| reliability [14] - 614:10, 614:11, 614:14, 615:3, 615:5, 615:9, 619:7, 626:20, 631:10, 657:9, 659:8, 661:11, 661:19, 662:2 | removed [2] - 354:10, 564:3 | required [2] - 578:17, 626:11 | restore [1] - 387:13 | reverse [1] - 541:5 |
| reliant [1] - 354:14, 354:19, 356:6, 361:16, 366:17, 417:18, 436:10, 545:6, 666:15, 679:16, 680:13 | removing [11] - 493:2, 541:16, 542:16, 542:20, 543:2, 544:21, 547:5, 547:22, 550:9, 550:15, 559:1 | requirement [2] - 526:6, 587:11 | restored [1] - 408:12 | review [7] - 470:11, 471:3, 481:23, 546:24, 549:14, 550:5 |
| reliable [3] - 397:1, 610:24, 615:8 | rephrase [6] - 419:24, 462:13, 556:23, 578:5, 606:6, 645:23 | requires [7] - 527:8, 571:16, 605:18, 606:4, 625:6, 672:18, 680:14 | restricted [1] - 684:8 | revised [11] - 415:11, 499:12, 499:17, 506:3, 518:17, 548:10, 550:12, 553:9, 554:2, 568:3, 637:15 |
| reliably [1] - 397:3 | replace [9] - 395:12, 395:21, 395:23, 396:2, 399:4, 399:8, 405:20, 406:12, 442:7 | research [12] - 386:11, 387:17, 403:23, 439:19, 453:16, 475:2, 475:3, 475:7, 475:10, 654:21, 689:2, 689:7 | restricts [1] - 684:23 | revision [1] - 458:23 |
| relied [2] - 633:4, 671:13 | repeated [2] - 567:17, 688:15 | reseed [2] - 415:12, 461:14 | result [9] - 528:19, 529:7, 529:9, 542:6, 543:15, 544:21, 587:5, 587:9, 673:14 | revisiting [1] - 365:4 |
| relies [1] - 633:21 | repeating [1] - 633:13 | researcher [1] - 476:18 | resulted [3] - 538:20, 563:23, 564:8 | revolution [1] - 391:16 |
| rely [3] - 362:7, 541:7, 632:10 | rephrase [6] - 419:24, 462:13, 556:23, 578:5, 606:6, 645:23 | resent [1] - 606:24 | resulting [1] - 633:16 | reward [1] - 483:12 |
| relying [2] - 362:9, 543:23 | replace [9] - 395:12, 395:21, 395:23, 396:2, 399:4, 399:8, 405:20, 406:12, 442:7 | reserved [2] - 353:4, 355:3 | resume [4] - 433:8, 531:5, 565:7, 566:21 | rewind [1] - 396:22 |
| remain [1] - 394:22 | replaced [2] - 395:16, 395:17 | reset [1] - 605:22 | retrieve [2] - 615:1, 682:2 | RICHARD [1] - 348:14 |
| remainder [1] - 548:20 | replacing [1] - 400:10 | reside [1] - 678:3 | retrieved [1] - 683:7 | rifle [1] - 485:5 |
| remaining [1] - 481:23 | report [28] - 360:12, 361:6, 362:9, 376:14, 378:14, 379:22, 578:13, 579:7, 579:10, 579:13, 579:14, 579:23, 579:24, 580:3, 580:15, 581:11, 583:7, 584:10, 588:15, 588:18, 596:20, 597:2, 597:3, 597:9, 597:10, 597:12, 597:18, 607:9 | residents [1] - 397:22 | retrieves [1] - 666:1 | right-hand [5] - 379:3, 419:8, 518:14, 602:1, 667:24 |
| remap [1] - 630:20 | reporting [1] - 487:9 | resolution [1] - 353:7 | return [43] - 386:10, 526:6, 526:9, 526:14, 526:17, 526:19, 526:20, 526:21, 527:3, 527:10, 527:20, 527:22, 528:22, 529:19, 541:6, 541:8, 541:14, 541:17, 541:18, 571:11, 578:3, 581:13, 581:24, 582:5, 582:10, 582:11, 582:18, 582:21, 583:4, 583:8, 583:18, 583:22, 584:7, 584:11, 584:22, 586:18, 586:22, 588:19, 603:20, 605:10, 605:18 | rights [1] - 625:9 |
| remapping [1] - 645:17 | replacing [1] - 400:10 | resolve [2] - 365:12, 571:1 | returned [4] - 439:18, 522:17, 571:18, 577:14 | RIZK [1] - 349:13 |
| remember [27] - 353:12, 353:13, 395:15, 402:7, 410:20, 411:5, 411:18, 411:19, 415:18, 424:1, 432:6, 451:6, 451:11, 458:13, 462:7, 465:6, 467:20, 468:7, 469:1, 469:7, 469:10, 469:23, 580:17, 596:19, 603:13, 612:10, 690:5 | report [28] - 360:12, 361:6, 362:9, 376:14, 378:14, 379:22, 578:13, 579:7, 579:10, 579:13, 579:14, 579:23, 579:24, 580:3, 580:15, 581:11, 583:7, 584:10, 588:15, 588:18, 596:20, 597:2, 597:3, 597:9, 597:10, 597:12, 597:18, 607:9 | resolved [1] - 355:11 | resulted [3] - 538:20, 563:23, 564:8 | RMR [1] - 692:20 |
| remembered [1] - 411:14 | REPORTER [1] - 692:5 | resort [1] - 586:12 | resulting [1] - 633:16 | road [1] - 508:3 |
| remembers [2] - 413:7, 413:21 | Reporter [2] - 692:8 | resources [2] - 408:10, 495:13 | resume [4] - 433:8, 531:5, 565:7, 566:21 | ROBERT [1] - 349:11 |
| remind [5] - 424:10, | reporting [1] - 487:9 | respect [14] - 352:21, 354:4, 459:21, 467:18, 471:15, 471:22, 472:5, 498:22, 538:20, 538:22, 585:9, 585:10, 663:16, 680:20 | retrieved [1] - 683:7 | role [2] - 373:22, 376:15 |
| | reports [2] - 378:3, 584:6 | respective [9] - 628:8, 628:9, 628:12, 675:6, 675:22, 676:6, 685:16, 687:1, 687:2 | returned [4] - 439:18, 522:17, 571:18, 577:14 | room [1] - 359:4 |
| | reposition [1] - 477:21 | respective's [1] - 676:7 | resulting [1] - 633:16 | roommate [1] - 394:6 |
| | represent [4] - 353:20, 565:15, 597:13, 598:18 | responsibilities [6] - 372:16, 507:16, 614:9, 615:14, 619:4, 624:11 | resulting [1] - 633:16 | ROSENBERG [30] - 348:23, 479:9, 479:12, 479:16, 488:19, 489:2, 506:7, 506:13, 508:23, 509:1, 525:13, 531:2, 533:8, 533:10, 544:18, 545:1, 546:4, 546:13, |
| | representation [3] - 412:17, 494:12, 674:11 | responsibility [1] - 615:20 | resulting [1] - 633:16 | |
| | represented [4] - 468:6, 515:2, 565:22, 668:8 | responsible [2] - | resulting [1] - 633:16 | |
| | representing [2] - | | resulting [1] - 633:16 | |

Hawkins Reporting Service

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| | | | | |
|---|---|---|---|--|
| 546:21, 549:12, 553:12, 553:18, 554:4, 554:10, 564:10, 582:23, 601:21, 601:23, 604:12, 607:16 Rosenberg [9] - 358:24, 359:3, 478:23, 507:15, 508:22, 530:23, 533:7, 570:12, 601:20 rotating [5] - 485:14, 491:21, 498:3, 514:23, 515:2 roughly [2] - 548:18, 548:19 routine [3] - 581:14, 581:23, 582:10 routines [2] - 581:12, 582:9 row [1] - 684:14 royalty [1] - 356:7 rule [1] - 353:24 Rule [2] - 352:1, 650:13 rules [1] - 578:16 ruling [1] - 353:4 rulings [1] - 365:4 run [5] - 405:7, 405:19, 429:8, 566:12, 593:4 running [9] - 426:24, 491:10, 494:23, 495:10, 505:2, 514:24, 558:6, 574:22, 684:20 runs [1] - 566:16 sabbatical [8] - 383:15, 383:16, 385:21, 385:23, 386:7, 386:8, 394:23, 394:24 safe [1] - 614:18 salary [3] - 395:1, 395:4, 440:24 sale [1] - 371:4 sales [3] - 358:8, 409:12, 475:12 satisfied [1] - 678:6 satisfies [1] - 571:23 satisfy [1] - 678:4 sauce [1] - 550:18 save [9] - 369:23, 451:24, 481:22, 492:17, 493:11, 493:13, 498:19, 502:16, 517:2 saved [1] - 518:10 saves [2] - 497:22, | 498:9 saving [6] - 369:19, 493:13, 496:4, 498:17, 502:11 saw [14] - 381:7, 398:1, 413:2, 413:8, 434:19, 435:5, 435:17, 523:21, 582:21, 585:19, 676:11, 676:22, 677:3, 681:20 scenario [1] - 594:16 scheme [1] - 662:1 scholarly [1] - 638:21 school [6] - 390:8, 390:9, 483:5, 615:16, 616:2, 616:4 science [7] - 482:14, 519:17, 527:19, 653:21, 653:24, 654:4, 654:8 Science [3] - 390:15, 482:22, 653:20 scientist [1] - 476:21 scientists [1] - 638:14 scope [3] - 445:10, 589:4, 643:4 scores [1] - 589:15 Scott [1] - 545:3 scratch [1] - 551:15 screen [24] - 359:20, 378:18, 411:16, 428:12, 451:2, 454:21, 458:21, 459:11, 484:11, 489:21, 518:13, 526:17, 535:6, 539:11, 541:23, 542:12, 585:19, 597:5, 632:12, 633:24, 634:7, 639:9, 665:13, 668:1 screenshot [1] - 411:17 SD [67] - 516:3, 516:4, 516:8, 516:13, 517:4, 517:8, 517:11, 517:14, 519:9, 520:19, 521:2, 521:22, 522:2, 522:13, 522:16, 523:8, 523:9, 523:18, 524:18, 524:21, 524:23, 525:4, 525:8, 525:16, 525:20, 525:21, 529:19, 541:7, 572:2, 572:3, 572:5, 573:13, 573:14, | 573:17, 573:21, 573:24, 574:3, 574:12, 574:13, 574:15, 574:23, 575:3, 575:4, 575:9, 575:13, 575:14, 576:16, 576:20, 576:22, 577:11, 584:19, 584:24, 585:6, 585:11, 585:15, 586:24, 587:17, 588:23, 589:6, 603:18, 604:7, 604:16, 604:23, 605:11, 605:22, 606:21, 643:20 seal [1] - 692:15 search [3] - 441:18, 646:23, 647:4 searched [1] - 456:21 searches [1] - 517:23 searching [4] - 442:2, 517:14, 646:17, 646:20 season [1] - 561:12 seat [1] - 367:4 seated [9] - 350:2, 367:9, 438:17, 438:19, 531:11, 532:13, 533:2, 631:18, 636:14 second [24] - 355:19, 363:8, 363:13, 378:2, 385:8, 401:22, 401:23, 428:8, 478:2, 491:1, 497:5, 539:10, 560:24, 605:7, 610:5, 618:4, 618:9, 629:4, 629:7, 633:11, 682:12, 685:13, 688:15 secondary [1] - 488:3 secondly [1] - 543:19 seconds [1] - 689:15 secret [1] - 550:18 section [6] - 610:2, 639:13, 640:16, 640:18, 661:10, 666:10 sector [9] - 539:3 sectors [3] - 495:1, 539:9, 539:13 see [53] - 359:15, 364:24, 373:3, 373:17, 374:12, 377:23, 378:6, 419:7, 450:7, 464:10, 468:6, | 471:17, 484:18, 496:9, 500:2, 502:13, 511:9, 515:14, 517:24, 523:16, 532:9, 532:20, 536:3, 537:2, 561:6, 574:1, 590:2, 597:8, 597:15, 601:24, 602:5, 606:9, 610:1, 618:14, 627:2, 633:18, 639:12, 641:4, 650:4, 652:4, 652:10, 656:7, 659:13, 661:16, 662:17, 662:23, 663:22, 665:15, 666:23, 668:1, 670:14, 684:13, 691:15 seed [1] - 436:16 seeing [1] - 353:12 seeking [1] - 351:9 seem [3] - 414:11, 631:13, 635:4 segment [50] - 387:18, 400:18, 403:24, 494:6, 494:9, 494:11, 496:14, 496:18, 496:19, 496:21, 496:23, 507:6, 509:10, 511:8, 512:1, 512:16, 512:17, 514:9, 515:12, 515:18, 515:24, 516:20, 517:12, 517:19, 518:4, 518:6, 518:9, 518:20, 518:21, 519:9, 520:16, 520:22, 521:19, 525:6, 536:5, 536:8, 536:18, 571:17, 627:14, 668:8, 676:8, 676:12, 681:4, 681:6, 681:7, 685:15, 687:2, 687:5 segment's [1] - 523:3 segments [49] - 388:11, 388:12, 410:1, 410:3, 418:24, 490:19, 494:13, 494:15, 494:20, 507:5, 510:12, 511:23, 516:6, 516:10, 516:17, 535:10, 535:17, 535:18, 536:1, 536:15, | 627:23, 628:7, 628:10, 628:13, 628:22, 629:14, 648:16, 658:20, 667:15, 667:21, 668:10, 669:1, 671:23, 672:19, 672:20, 672:22, 673:14, 674:3, 675:7, 675:23, 676:6, 676:8, 676:12, 678:3, 678:12, 679:11, 685:17, 686:19, 686:22 selecting [1] - 601:13 selection [1] - 596:24 sell [12] - 389:17, 442:19, 474:18, 474:20, 488:2, 530:14, 530:18, 563:9, 601:7, 601:10, 613:11 selling [4] - 381:13, 484:8, 530:13, 530:17 sells [1] - 513:8 semiconductor [29] - 619:20, 620:10, 623:1, 623:11, 623:22, 624:1, 624:22, 625:17, 625:19, 627:20, 627:23, 628:5, 628:17, 631:9, 643:18, 644:9, 644:10, 649:9, 658:7, 658:17, 659:1, 659:9, 662:11, 662:12, 672:19, 672:22, 675:6, 675:22 send [6] - 373:11, 373:13, 574:3, 575:1, 576:2, 605:23 sending [5] - 491:1, 574:5, 574:14, 574:16, 574:18 sends [1] - 575:10 senior [2] - 371:15, 613:22 sense [9] - 389:22, 392:22, 401:9, 403:21, 433:20, 522:20, 689:22, 691:4, 691:12 sent [6] - 372:10, 372:11, 372:23, 373:6, 493:8, 574:23 sentence [7] - 362:10, |
|---|---|---|---|--|

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(302) 658-6697 FAX (302) 658-8418

362:12, 412:3,
452:21, 454:1,
509:4, 579:18
separate [11] - 413:22,
533:17, 567:22,
585:3, 585:4,
585:13, 587:20,
597:21, 618:6,
628:20
September [2] -
386:21, 396:17
series [2] - 380:9,
473:14
serious [2] - 433:18,
602:22
serve [1] - 565:3
served [6] - 439:9,
439:15, 440:13,
440:23, 567:6, 588:8
server [2] - 396:12,
407:6
service [1] - 565:20
serving [1] - 444:21
session [1] - 624:2
set [8] - 371:23,
395:11, 399:5,
399:7, 404:18,
580:24, 630:16,
692:14
sets [3] - 406:7,
537:24, 539:4
setting [2] - 465:17,
466:3
seven [3] - 379:18,
458:14, 674:15
seven-hour [1] -
458:14
several [22] - 368:20,
375:24, 383:16,
394:2, 398:14,
401:17, 406:18,
429:5, 442:15,
449:17, 464:11,
481:19, 501:6,
565:9, 565:15,
567:13, 580:5,
611:12, 613:21,
616:17, 617:8,
667:12
shape [3] - 669:2,
669:3, 669:5
share [4] - 400:15,
403:22, 404:2, 477:8
shares [3] - 441:7,
477:21, 477:22
SHAW [2] - 349:8,
349:8
Shaw [1] - 359:8
shipped [1] - 442:22
shipping [1] - 409:9

short [3] - 355:17,
355:22, 691:7
shorter [2] - 352:15,
624:19
Shorthand [1] - 692:8
shortly [2] - 637:11,
691:9
shots [5] - 411:9,
411:15, 428:13,
458:21, 459:11
show [30] - 359:1,
359:13, 424:19,
467:15, 468:10,
469:13, 469:16,
477:1, 494:2,
514:23, 524:9,
535:11, 568:23,
572:13, 572:18,
572:21, 582:13,
583:14, 587:3,
633:8, 638:24,
661:4, 663:23,
667:16, 679:13,
680:6, 680:21,
682:23, 682:24
showed [7] - 380:13,
496:20, 497:11,
517:13, 521:15,
552:17, 582:17
showing [8] - 409:16,
418:22, 437:16,
573:23, 574:22,
621:11, 628:7,
647:22
shown [7] - 456:6,
491:24, 545:24,
585:18, 632:4,
664:22, 677:13
shows [8] - 466:11,
466:13, 565:8,
663:10, 672:4,
679:9, 686:10, 687:8
shrink [3] - 398:22,
399:3, 406:19
shrunk [2] - 363:20,
363:21
sick [1] - 439:20
Side [2] - 412:8, 650:7
side [17] - 396:15,
412:7, 419:8,
489:20, 489:24,
490:6, 491:4, 494:3,
518:12, 518:14,
538:4, 539:11,
540:4, 541:23,
546:1, 650:6
sign [2] - 461:3,
472:11
signed [1] - 462:1
significance [1] -

669:3
significant [7] - 398:7,
427:20, 435:16,
493:14, 498:1,
502:12, 570:5
significantly [1] -
502:2
similar [6] - 390:9,
390:10, 395:20,
398:20, 514:2, 631:8
simple [3] - 618:2,
626:6, 647:23
simplicity [1] - 677:13
simplify [1] - 406:13
simplifying [1] - 454:3
simply [7] - 471:7,
475:11, 542:20,
632:14, 633:3,
633:10, 633:13
single [5] - 493:3,
541:10, 600:19,
622:5, 656:21
sit [1] - 426:13
sitting [1] - 359:4
situate [1] - 416:11
situation [1] - 629:5
six [15] - 360:20,
381:13, 383:15,
557:20, 557:23,
558:8, 558:12,
559:21, 562:11,
610:15, 622:12,
627:3, 634:18,
634:20, 635:22
six-and-a-half [2] -
559:21, 562:11
size [4] - 418:19,
484:18, 539:5
sized [1] - 619:12
skill [2] - 684:1, 684:7
skip [3] - 416:1, 656:4,
676:7
slide [31] - 481:14,
489:18, 546:1,
549:20, 572:7,
602:2, 606:1,
617:24, 620:11,
620:15, 621:6,
622:6, 634:9,
636:10, 650:18,
650:23, 656:16,
667:16, 667:22,
668:11, 669:8,
670:10, 670:11,
671:5, 673:3,
673:20, 675:13,
677:6, 680:6, 680:21
Slide [1] - 679:13
slides [13] - 632:3,
632:19, 634:15

634:20, 635:3,
635:22, 638:9,
647:22, 655:16,
656:23, 667:18,
674:5, 676:15
sliding [1] - 539:13
slogan [1] - 474:24
Slootman [8] - 353:2,
353:10, 353:23,
354:1, 555:13,
555:15, 555:23,
556:7
slow [3] - 401:2,
401:9, 492:8
slower [1] - 625:17
small [7] - 388:17,
447:3, 577:21,
601:3, 616:8, 618:3,
618:16
smaller [1] - 386:3
smart [1] - 651:11
snap [1] - 498:6
snippets [1] - 634:6
so-called [1] - 410:2
society [1] - 490:14
software [86] - 448:15,
485:22, 491:10,
504:11, 504:16,
504:22, 504:23,
504:24, 505:1,
505:2, 505:8,
505:10, 505:11,
505:15, 505:18,
506:16, 506:19,
506:22, 509:13,
509:22, 512:4,
513:7, 514:24,
515:1, 515:3,
515:11, 515:17,
515:22, 516:2,
517:3, 517:6,
517:10, 517:14,
517:19, 517:21,
517:23, 518:3,
518:8, 518:22,
518:23, 519:2,
519:4, 519:7, 520:8,
520:15, 520:18,
520:21, 521:1,
521:21, 523:8,
524:1, 524:5, 524:9,
525:2, 525:3,
525:24, 526:22,
529:14, 533:14,
542:24, 566:5,
566:11, 566:16,
566:22, 567:3,
574:11, 575:2,
575:12, 575:16,
576:7, 576:24,

577:2, 577:24,
578:5, 580:7,
603:12, 605:12,
606:17, 606:20,
673:16, 674:10,
680:10, 680:16,
684:19, 684:20
softwares [1] - 566:12
sold [11] - 356:11,
356:21, 357:11,
357:18, 357:21,
457:12, 488:7,
551:8, 551:23,
552:3, 613:6
solid [12] - 491:22,
497:18, 647:5,
647:13, 662:4,
662:10, 662:13,
670:14, 670:19,
670:21
solution [3] - 355:18,
399:20, 626:13
solutions [2] - 538:1,
539:19
solve [9] - 389:7,
409:7, 409:8,
448:21, 501:9,
501:10, 502:18,
624:22, 631:4
someone [2] - 475:1,
477:10
sometime [2] -
469:14, 531:20
sometimes [3] -
397:1, 398:4, 507:17
somewhere [2] -
619:16, 629:10
son [2] - 381:8, 612:11
soon [1] - 661:5
sorry [25] - 364:19,
380:23, 390:22,
402:15, 430:20,
433:16, 434:2,
458:10, 462:14,
521:7, 536:3, 548:2,
579:9, 608:4,
640:23, 643:8,
646:3, 647:9,
647:10, 664:9,
670:23, 673:3,
680:12, 689:11,
689:16
sort [12] - 390:9,
392:4, 394:18,
415:4, 435:21,
442:3, 490:13,
527:14, 568:3,
572:17, 572:18,
634:6
sounding [1] - 355:10

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| | |
|---|--|
| sounds [3] - 371:12, 436:16, 690:23 source [43] - 361:8, 505:11, 505:12, 505:13, 505:16, 518:17, 527:23, 528:23, 572:22, 573:2, 573:4, 580:6, 581:1, 581:5, 581:8, 581:12, 581:21, 582:8, 582:14, 582:19, 583:7, 584:1, 584:4, 585:12, 585:15, 590:3, 590:7, 603:15, 603:17, 603:22, 604:2, 604:5, 604:14, 604:21, 607:11, 607:14, 659:23, 671:7, 672:11, 674:12, 677:5, 683:9, 683:12 sources [1] - 646:22 space [16] - 369:18, 369:24, 398:23, 481:22, 493:14, 536:17, 602:16, 602:21, 618:14, 618:22, 619:17, 620:2, 659:12, 662:7, 681:22 spare [1] - 495:11 speaking [3] - 365:18, 458:9, 478:23 speaks [1] - 549:6 spec [2] - 462:11, 462:17 special [1] - 398:22 specialist [2] - 484:4, 484:6 specific [9] - 405:22, 430:22, 455:7, 455:12, 504:11, 526:7, 583:7, 601:1, 612:20 specifically [10] - 352:19, 366:7, 512:3, 537:19, 552:12, 592:9, 605:22, 662:3, 669:20, 683:2 specification [33] - 425:3, 425:4, 425:9, 425:12, 425:16, 425:18, 425:19, 426:2, 426:14, 426:18, 426:20, 427:2, 427:5, 429:3, 430:7, 431:11, 455:20, 455:22, 456:3, 459:5, 460:8, 472:3, 501:2, 501:4, 501:14, 501:16, 501:18, 501:22, 503:13, 553:22, 554:2, 590:4 specifications [1] - 425:17 specified [1] - 679:11 specify [1] - 630:9 speculation [1] - 549:7 speculative [1] - 676:6 speed [4] - 407:9, 430:14, 546:14, 614:24 spell [3] - 478:24, 487:16, 608:8 spend [1] - 394:19 spent [2] - 604:1, 607:13 spin [1] - 566:10 spinning [4] - 443:7, 525:1, 590:22, 666:21 split [3] - 490:19, 518:24, 526:12 spokesperson [1] - 637:21 spot [1] - 652:21 square [1] - 681:9 SSD [5] - 446:9, 446:12, 665:5, 671:21, 678:9 SSD's [2] - 670:1, 685:10 stable [1] - 541:7 stamps [1] - 475:23 standard [3] - 425:13, 426:21, 461:5 standards [1] - 541:21 Standford [1] - 394:3 standpoint [1] - 596:4 stands [3] - 377:17, 449:18, 656:7 Stanford [5] - 385:23, 386:4, 386:5, 386:6, 386:8 start [34] - 356:2, 385:24, 386:11, 386:19, 386:20, 387:17, 394:11, 394:16, 394:20, 395:3, 399:10, 399:23, 400:1, 405:6, 411:2, 416:8, 417:20, 418:7, 427:1, 448:14, 459:16, 504:2, 507:2, 561:9, 573:12, 573:18, 576:14, 606:8, 621:23, 630:19, 664:8, 665:16, 688:9, 688:11 started [10] - 364:11, 415:11, 415:19, 415:24, 416:11, 442:6, 448:4, 599:19, 632:1, 659:3 starting [2] - 489:19, 551:23 starts [2] - 504:5, 682:19 startup [8] - 384:11, 386:18, 399:5, 399:13, 399:14, 404:15, 439:22, 560:11 startups [3] - 386:16, 447:12, 447:16 State [1] - 692:1 state [18] - 362:5, 383:1, 478:24, 491:22, 497:18, 608:8, 608:24, 647:6, 647:14, 652:15, 662:4, 662:10, 662:13, 670:14, 670:19, 670:21 statement [29] - 365:3, 438:1, 470:24, 526:7, 526:9, 526:15, 526:17, 526:19, 526:21, 527:3, 527:10, 527:22, 528:22, 529:19, 541:6, 541:8, 541:15, 541:17, 541:19, 548:2, 548:11, 570:2, 582:1, 582:6, 582:11, 586:19, 603:20, 605:10, 605:18 statements [9] - 365:8, 544:13, 547:9, 555:6, 555:12, 556:6, 633:21, 633:23, 635:13 STATES [1] - 348:1 states [1] - 676:5 States [12] - 348:15, 391:2, 391:4, 391:13, 391:20, 482:23, 482:24, 483:23, 530:9, 530:11, 530:15, 530:19 stating [1] - 377:21 statistics [3] - 397:10, 557:13, 558:22 stay [2] - 432:22, 586:1 stayed [2] - 392:14, 617:1 stenographic [1] - 692:11 step [38] - 382:2, 382:9, 389:20, 393:14, 405:2, 432:24, 478:14, 510:8, 510:9, 521:8, 521:23, 522:1, 522:4, 525:19, 525:21, 527:3, 527:6, 527:17, 528:7, 528:24, 529:13, 531:10, 533:14, 535:22, 536:13, 536:19, 603:12, 605:9, 605:13, 605:18, 606:3, 606:4, 606:19, 606:22, 607:1, 607:19, 623:23, 649:23 steps [3] - 504:20, 505:9, 506:22 stick [1] - 515:5 still [27] - 354:12, 357:22, 363:16, 364:20, 371:9, 373:15, 374:4, 381:19, 419:14, 463:8, 463:9, 463:10, 463:24, 534:12, 535:2, 538:23, 541:5, 541:8, 541:11, 541:14, 593:4, 594:22, 613:11, 631:14, 650:23, 687:12, 690:18 stipulated [2] - 435:11, 437:22 stipulations [1] - 366:19 stock [5] - 432:9, 439:24, 440:2, 440:5, 441:5 stood [2] - 364:20, 484:19 stop [5] - 395:4, 465:12, 545:20, 561:20, 673:2 STORAGE [1] - 348:7 storage [154] - 351:13, 368:18, 369:1, 369:8, 377:14, 377:16, 377:22, 378:10, 387:3, 388:13, 388:21, 388:22, 389:6, 398:10, 398:23, 400:1, 400:17, 400:19, 404:1, 405:12, 405:18, 406:3, 406:12, 407:6, 408:8, 409:1, 410:14, 434:22, 436:5, 442:13, 442:21, 443:9, 444:16, 446:12, 449:19, 449:22, 450:22, 452:15, 452:16, 453:6, 454:3, 463:15, 473:19, 474:7, 474:8, 484:4, 484:5, 484:6, 484:8, 485:19, 486:7, 486:10, 486:14, 486:15, 486:16, 486:18, 486:20, 487:11, 487:12, 487:22, 488:11, 488:15, 488:16, 488:21, 489:9, 489:10, 489:12, 489:14, 489:15, 489:22, 490:5, 490:6, 490:7, 490:16, 490:21, 491:3, 491:6, 491:7, 491:14, 491:15, 491:16, 491:18, 492:2, 492:3, 492:16, 493:14, 494:5, 494:7, 494:23, 495:16, 495:19, 496:7, 496:9, 497:2, 497:3, 497:23, 498:7, 499:15, 499:22, 500:16, 500:22, 501:11, 505:3, 514:4, 514:5, 514:22, 516:23, 535:12, 535:18, 536:5, 536:23, 543:17, 543:18, 543:19, 555:6, 557:5, 559:11, 559:22, 560:22, 560:24, 562:18, 563:7, 568:2, 568:6, 568:13, 590:18, | |
|---|--|

Hawkins Reporting Service

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| | | | | |
|--|--|--|---|--|
| <p>591:6, 592:12, 592:22, 601:8, 601:10, 602:9, 603:2, 610:18, 610:21, 613:6, 613:9, 614:17, 615:10, 618:5, 618:7, 618:17, 622:14, 654:15, 654:21, 655:8, 657:9, 659:6, 666:19, 679:18, 680:23 Storage [160] - 352:17, 352:24, 354:3, 365:20, 366:5, 366:15, 373:1, 380:19, 381:3, 446:21, 447:2, 447:4, 447:8, 448:1, 448:4, 448:7, 448:8, 479:23, 480:10, 481:9, 481:12, 485:15, 503:17, 503:21, 503:24, 504:17, 505:5, 505:8, 505:19, 505:22, 505:23, 507:1, 510:2, 510:4, 512:7, 512:9, 513:2, 513:8, 513:11, 513:14, 513:21, 515:19, 518:18, 520:7, 520:14, 521:1, 525:18, 526:5, 528:5, 528:8, 529:22, 529:24, 530:7, 533:23, 534:7, 535:2, 537:17, 537:19, 537:21, 538:6, 538:12, 538:17, 539:16, 540:6, 540:14, 540:17, 540:18, 540:21, 541:22, 542:14, 543:3, 544:8, 545:4, 546:24, 548:3, 548:16, 548:23, 549:14, 550:2, 550:6, 550:8, 552:18, 555:18, 556:19, 556:24, 557:12, 558:15, 559:12, 559:19, 559:20, 563:6, 563:8, 563:11, 563:15, 563:17, 563:22, 564:3, 569:12, 572:19, 575:12, 587:16,</p> | <p>594:12, 594:14, 594:19, 595:19, 601:4, 602:5, 602:18, 603:1, 603:21, 604:15, 605:9, 605:12, 627:10, 633:1, 633:7, 660:4, 660:15, 660:23, 661:1, 661:3, 661:22, 661:24, 664:10, 666:18, 667:2, 669:10, 669:24, 670:1, 670:5, 670:12, 671:10, 671:13, 671:16, 673:5, 674:8, 674:10, 674:16, 676:2, 676:22, 677:4, 678:19, 679:7, 680:4, 680:8, 680:10, 680:12, 680:15, 681:11, 681:18, 681:19, 682:8, 682:12, 682:15, 682:22, 683:10, 685:4, 685:8, 686:6 Storage's [39] - 360:7, 365:22, 434:6, 509:13, 509:22, 512:3, 513:20, 514:1, 514:19, 516:1, 520:7, 520:24, 521:16, 522:4, 522:13, 523:4, 523:13, 523:16, 527:23, 528:23, 529:14, 538:6, 540:5, 541:24, 542:12, 544:4, 545:8, 545:14, 547:6, 548:6, 556:17, 557:9, 557:11, 581:2, 607:10, 661:14, 665:2, 671:9, 686:8 store [15] - 388:12, 398:17, 410:3, 422:11, 489:13, 491:17, 496:4, 496:18, 496:19, 535:19, 553:21, 615:1, 629:10, 673:10, 682:18 stored [35] - 481:21, 489:17, 494:14, 494:16, 494:21, 495:2, 495:19,</p> | <p>495:19, 496:3, 496:6, 496:15, 497:8, 497:13, 497:14, 503:8, 510:11, 510:13, 512:18, 518:21, 520:17, 521:20, 522:13, 522:16, 522:21, 523:3, 536:15, 537:2, 541:10, 573:14, 573:20, 576:15, 576:22, 605:4, 656:20, 685:10 stores [7] - 397:17, 489:14, 496:11, 511:7, 520:19, 666:1, 682:16 storing [7] - 388:23, 442:18, 504:6, 504:12, 523:7, 535:8 story [1] - 350:21 straightforward [1] - 398:17 stream [10] - 490:3, 490:15, 494:4, 507:4, 514:4, 521:12, 535:9, 535:17, 535:21 streaming [1] - 490:21 streams [2] - 491:2, 491:11 Street [1] - 348:12 stricken [2] - 412:18, 413:16 strike [6] - 379:8, 412:1, 417:3, 443:3, 539:24, 585:22 stripe [5] - 673:7, 673:21, 673:23, 675:20 stripes [1] - 674:1 struck [5] - 412:11, 412:19, 414:3, 414:14, 415:1 structure [8] - 408:18, 418:20, 418:23, 419:4, 419:12, 419:13, 516:3 structures [1] - 626:14 STUART [1] - 348:23 Stuart [1] - 478:22 student [2] - 394:3, 654:18 students [3] - 391:17, 654:20, 655:5 studied [2] - 482:14, 611:20 studies [3] - 390:13, 390:18, 390:19, 475:13, 475:15,</p> | <p>study [6] - 390:17, 391:11, 391:13, 391:18, 482:13, 611:19 studying [1] - 483:10 stuff [6] - 437:11, 487:7, 641:23, 642:6, 642:9, 651:9 stuttering [2] - 633:12, 633:18 sub [1] - 690:21 subbullet [1] - 378:2 subdivide [1] - 648:21 subdivided [1] - 671:19 subdivision [1] - 672:13 subdivisions [1] - 658:21 subject [3] - 434:22, 611:5, 651:10 subjects [1] - 350:19 submillisecond [1] - 545:12 submitted [2] - 352:22, 353:8 subroutine [1] - 519:2 subroutines [3] - 519:1, 526:11, 526:13 subset [4] - 510:10, 541:12, 668:16, 671:1 subsets [1] - 671:4 substantially [11] - 528:17, 528:18, 528:19, 529:3, 529:5, 529:9, 587:6, 587:7, 587:8, 587:9, 650:16 substitute [2] - 556:21, 557:2 subsystem [5] - 613:23, 617:20, 626:18, 643:12, 643:22 subtext [1] - 438:3 succeed [1] - 400:3 success [29] - 350:19, 351:1, 351:8, 352:2, 352:14, 352:20, 352:22, 354:5, 354:14, 356:4, 356:9, 356:19, 361:17, 361:18, 362:10, 443:1, 443:6, 473:2, 473:15, 474:11, 474:15, 475:5, 475:13, 475:15,</p> | <p>550:22, 554:23, 555:3, 556:13, 556:16 successful [6] - 362:4, 362:16, 472:16, 472:19, 501:24, 611:1 successfully [4] - 516:5, 517:1, 520:20, 520:22 Sucks [1] - 555:19 suffer [1] - 629:11 suggest [2] - 436:22 suggested [3] - 542:4, 564:2, 592:2 suggestion [3] - 365:11, 539:2, 541:19 suggestions [4] - 533:22, 540:10, 541:16, 541:20 suit [2] - 355:24, 356:1 sum [1] - 563:14 summarize [7] - 498:20, 529:11, 529:21, 651:12, 655:17, 671:11, 676:21 summarized [1] - 682:20 summarizing [1] - 651:8 summary [8] - 360:2, 418:22, 536:16, 536:17, 622:8, 651:10, 686:3 supplemental [4] - 597:2, 597:3, 597:10, 597:11 support [9] - 362:18, 409:15, 485:22, 549:18, 550:8, 555:7, 578:20, 633:3, 633:22 supported [1] - 486:3 supporting [2] - 484:3, 485:21 supports [8] - 547:4, 548:6, 548:10, 548:14, 549:22, 550:14, 554:18, 651:1 supposed [1] - 386:9 supposedly [1] - 537:21 sustain [4] - 454:9, 525:12, 643:7, 646:14 sustian [1] - 647:16 SUTCLIFFE [1] -</p> |
|--|--|--|---|--|

Hawkins Reporting Service

715 North King Street - Wilmington, Delaware 19801

(302) 658-6697 FAX (302) 658-8418

349:3
switching [1] - 472:16
sworn [4] - 382:14,
 479:7, 608:15,
 651:23
symbol [2] - 432:9,
 432:10
Symmetrix [1] - 649:5
Symmetrix [8] - 613:5,
 613:12, 613:24,
 614:6, 617:18,
 639:18, 639:22,
 649:16
synthesize [1] -
 651:14
system [104] - 373:2,
 387:3, 388:21,
 389:6, 405:12,
 405:18, 406:12,
 436:5, 436:6, 437:2,
 442:7, 443:10,
 450:8, 453:6,
 453:18, 466:22,
 466:23, 473:19,
 474:7, 474:8,
 481:20, 483:15,
 484:3, 488:2,
 489:12, 489:14,
 489:15, 490:5,
 490:6, 490:17,
 490:22, 491:4,
 491:7, 491:15,
 492:2, 492:16,
 493:12, 494:5,
 495:17, 495:19,
 499:15, 499:22,
 500:22, 501:11,
 502:11, 505:3,
 505:4, 506:18,
 516:23, 523:4,
 535:12, 536:23,
 560:23, 562:19,
 573:6, 577:20,
 578:1, 588:11,
 613:10, 614:10,
 615:8, 618:5,
 618:19, 619:9,
 619:14, 623:22,
 625:15, 625:19,
 626:5, 628:19,
 629:24, 630:15,
 630:19, 631:9,
 634:5, 643:14,
 643:17, 645:4,
 648:20, 649:17,
 649:18, 657:9,
 665:17, 665:20,
 665:22, 665:23,
 666:1, 666:16,
 667:9, 669:24,

671:8, 672:18,
 676:3, 677:18,
 680:5, 680:8,
 680:13, 681:11,
 681:18, 681:19,
 682:12, 686:16,
 687:9
systems [38] - 388:22,
 467:1, 484:6, 484:8,
 484:14, 485:19,
 486:3, 486:4,
 486:10, 486:15,
 486:16, 486:18,
 486:21, 487:12,
 487:13, 487:22,
 488:11, 488:15,
 488:17, 488:21,
 489:10, 491:8,
 493:15, 560:8,
 568:2, 594:9,
 619:11, 622:20,
 625:3, 626:7,
 630:13, 644:21,
 645:6, 645:11, 649:6
SYSTEMS [1] - 348:4
table [103] - 418:18,
 419:1, 419:2, 419:3,
 516:3, 516:4, 516:6,
 516:8, 516:13,
 516:17, 517:4,
 517:8, 517:11,
 517:14, 517:16,
 517:17, 517:18,
 517:22, 517:24,
 518:5, 518:7, 519:9,
 519:10, 520:19,
 520:20, 521:2,
 521:22, 522:2,
 522:13, 522:16,
 523:8, 523:9,
 523:18, 524:18,
 524:20, 524:21,
 524:22, 524:23,
 525:5, 525:6, 525:8,
 525:16, 525:20,
 525:21, 529:19,
 541:8, 541:10,
 572:2, 572:3, 572:4,
 572:5, 573:13,
 573:14, 573:17,
 573:18, 573:21,
 573:24, 574:3,
 574:9, 574:12,
 574:13, 574:15,
 574:17, 574:18,
 574:22, 574:23,
 574:24, 575:3,
 575:4, 575:10,
 575:13, 575:14,
 576:16, 576:20,
 576:22, 57 Hawkins Reporting Service

584:19, 585:1,
 585:6, 585:11,
 585:15, 586:24,
 587:17, 589:6,
 603:18, 604:7,
 604:16, 604:23,
 605:11, 605:21,
 605:22, 606:21,
 606:24
tables [5] - 575:6,
 575:22, 575:24,
 576:3, 605:2
tag [7] - 515:5, 515:10,
 519:22, 536:7,
 536:10, 572:14,
 605:1
tags [2] - 516:13,
 518:13
tainted [1] - 415:13
takeaways [2] -
 378:15, 379:1
talks [7] - 418:17,
 501:16, 539:12,
 627:14, 639:14,
 639:19, 640:18
tape [32] - 395:12,
 395:23, 396:1,
 396:4, 396:15,
 396:21, 396:22,
 396:24, 397:8,
 397:12, 397:15,
 397:18, 398:4,
 398:8, 398:14,
 399:5, 399:8,
 399:21, 400:6,
 400:9, 400:10,
 405:21, 405:24,
 406:12, 406:24,
 442:7, 491:21,
 492:7, 492:10,
 690:18
Tape [1] - 555:18
tapes [6] - 395:16,
 395:18, 396:13,
 396:14, 397:11,
 406:19
targets [1] - 377:16
task [3] - 495:12,
 546:9, 560:9
tasks [1] - 618:24
taught [2] - 568:5,
 654:18
teaching [5] - 383:12,
 439:19, 486:22,
 487:12, 655:4
team [7] - 373:12,
 379:12, 385:24,
 386:18, 477:11,
 613:22, 619:5
Tech [2] - 652:19,

654:12
tech [1] - 653:3
technical [19] -
 358:12, 358:19,
 364:11, 407:9,
 437:9, 437:11,
 439:13, 440:13,
 440:16, 441:4,
 444:22, 445:6,
 446:20, 478:21,
 482:3, 577:23,
 593:21, 594:4, 594:5
technique [3] - 449:7,
 453:14, 548:5
techniques [5] -
 405:23, 406:6,
 451:14, 452:15,
 547:13
technological [2] -
 482:19, 652:9
Technologies [1] -
 487:15
technologies [16] -
 369:23, 370:7,
 449:1, 449:19,
 473:7, 473:15,
 473:17, 473:20,
 474:10, 474:13,
 474:17, 488:15,
 492:22, 566:4,
 654:15, 655:3
technologists [1] -
 568:13
technology [54] -
 356:5, 370:4,
 380:19, 381:4,
 388:3, 389:11,
 389:17, 400:1,
 400:4, 400:5,
 404:19, 425:6,
 425:14, 425:15,
 440:17, 443:15,
 445:3, 445:23,
 446:1, 446:15,
 446:22, 448:19,
 473:22, 473:23,
 474:6, 474:7,
 481:17, 481:18,
 487:5, 489:5, 489:6,
 489:9, 489:23,
 492:13, 497:17,
 498:3, 499:5,
 544:20, 553:2,
 553:8, 554:24,
 555:8, 555:9, 556:1,
 556:3, 556:11,
 610:16, 615:22,
 617:17, 617:21,
 620:9, 638:17,
 639:22, 655:21

telecommunication
 [1] - 482:15
telephone [1] - 483:8
temperature [1] -
 561:17
ten [7] - 397:10,
 397:17, 403:6,
 408:1, 408:5,
 508:16, 601:13
tend [1] - 369:21
Tennessee [1] - 654:9
term [11] - 368:18,
 387:20, 409:18,
 507:18, 507:22,
 507:23, 510:16,
 571:11, 668:13,
 668:14, 682:7
terminologies [1] -
 673:8
terminology [1] -
 387:20
terms [17] - 356:18,
 415:21, 417:18,
 446:4, 508:16,
 519:17, 527:19,
 527:20, 531:19,
 578:5, 582:11,
 602:7, 606:13,
 619:24, 623:15,
 625:9, 667:12
test [4] - 408:9,
 408:11, 426:4,
 487:22
testified [24] - 367:20,
 370:23, 382:15,
 448:9, 455:10,
 455:19, 467:4,
 468:14, 471:15,
 479:8, 499:24,
 556:1, 566:3, 566:5,
 566:7, 566:24,
 567:3, 567:9, 582:7,
 589:11, 608:16,
 633:7, 647:12,
 651:24
testify [11] - 352:21,
 359:10, 463:11,
 467:18, 468:22,
 551:16, 551:17,
 568:9, 581:18,
 609:6, 634:21
testifying [2] - 646:12,
 663:8
testimony [37] - 351:7,
 351:17, 361:9,
 415:22, 462:4,
 476:2, 544:17,
 548:15, 549:14,
 549:17, 549:21,
 550:7, 554:13,

554:17, 554:22,
572:22, 582:15,
632:7, 632:12,
632:16, 632:22,
637:16, 650:19,
651:3, 653:15,
655:14, 655:17,
655:23, 664:5,
671:9, 671:12,
671:15, 672:12,
677:3, 684:5, 685:7,
687:19
text [1] - 663:21
THE [212] - 348:1,
348:1, 348:14,
350:1, 350:6,
350:10, 350:13,
352:11, 352:16,
353:12, 353:19,
354:6, 354:16,
355:5, 355:9,
355:16, 356:8,
356:16, 357:3,
357:9, 357:18,
358:1, 358:7,
358:16, 358:21,
359:5, 359:7,
359:15, 359:21,
360:11, 360:15,
360:18, 360:23,
361:2, 361:10,
362:12, 362:17,
362:23, 363:3,
363:7, 363:11,
363:20, 363:24,
364:3, 364:6,
364:13, 364:16,
365:6, 366:1, 366:8,
366:20, 367:2,
367:6, 367:8, 372:6,
377:4, 380:2, 380:3,
380:22, 382:1,
382:3, 382:5,
382:10, 382:18,
382:20, 384:1,
385:1, 412:2, 412:6,
412:9, 412:22,
413:1, 413:6,
413:11, 413:17,
413:19, 414:2,
414:13, 414:18,
415:3, 415:16,
416:4, 416:13,
416:19, 416:24,
417:1, 419:23,
424:16, 430:10,
431:24, 432:17,
432:18, 432:23,
433:5, 433:7,
433:13, 433:24,
434:11, 434:24,
435:13, 435:19,
436:14, 437:5,
437:15, 438:6,
438:11, 438:15,
438:23, 445:15,
450:18, 451:20,
451:22, 451:24,
452:23, 453:8,
453:10, 454:8,
458:2, 458:8,
458:12, 460:17,
461:17, 465:10,
465:14, 474:2,
474:5, 475:17,
478:13, 478:15,
478:18, 478:24,
479:2, 479:11,
479:14, 488:24,
506:11, 507:14,
508:11, 525:11,
530:23, 531:3,
531:9, 531:18,
531:24, 532:8,
532:12, 532:17,
533:1, 544:23,
546:10, 546:19,
549:8, 549:9,
553:16, 554:8,
564:12, 564:15,
564:19, 564:22,
583:1, 583:3,
601:19, 604:10,
604:19, 607:18,
607:22, 608:4,
608:8, 608:10,
608:19, 609:21,
631:12, 631:24,
633:19, 634:10,
634:14, 635:1,
635:8, 635:20,
636:2, 636:7,
636:11, 636:19,
641:14, 641:19,
642:3, 643:5,
645:22, 646:14,
647:9, 647:15,
648:24, 649:13,
649:22, 650:1,
650:4, 650:8, 651:7,
651:20, 652:2,
652:8, 655:10,
663:4, 669:16,
674:24, 688:3,
688:7, 690:2, 690:8,
690:17, 690:23,
691:13
themselves [1] - 362:3
theory [2] - 605:7,
605:13
therefore [10] - 378:5,
396:13, 396:18, 398:19
408:8, 453:20,
496:3, 497:4,
588:20, 590:9,
621:17
they've [3] - 617:3,
632:19, 656:3
thinking [5] - 395:3,
395:14, 419:10,
530:24, 532:4
third [3] - 453:24,
658:14, 689:1
thirty [5] - 383:9,
476:15, 476:21,
690:18, 690:22
thirty-year [1] - 476:21
THOMAS [1] - 651:21
thoughts [1] - 688:19
thousand [6] - 387:11,
493:7, 493:8, 493:9,
516:22, 567:14
thousands [2] -
599:13, 599:15
three [28] - 381:22,
394:17, 429:8,
429:10, 430:3,
462:22, 462:24,
468:23, 469:5,
469:16, 470:20,
471:1, 492:1, 492:3,
508:13, 521:23,
522:1, 525:19,
558:5, 558:9,
558:19, 559:3,
618:15, 621:23,
622:3, 654:6, 658:4,
688:9
threw [1] - 360:3
throughout [6] -
655:19, 664:6,
667:2, 668:23,
675:19, 675:20
throughput [1] - 511:7
ticker [2] - 432:9,
432:10
tie [1] - 358:13
timeline [1] - 624:12
timely [1] - 614:20
timing [2] - 380:10,
401:10
title [12] - 436:4,
451:3, 452:14,
452:15, 466:9,
466:14, 466:18,
466:20, 499:14,
499:19, 499:21,
500:21
titles [1] - 690:5
Tivo's [1] - 395:18
today [33] - 373:2,
381:18, 381:19,
387:14, 388:19,
389:1, 399:24,
465:21, 473:11,
476:20, 479:20,
479:22, 480:16,
480:22, 481:1,
481:15, 481:16,
490:14, 491:9,
493:19, 499:23,
550:21, 569:9,
590:19, 603:10,
604:4, 604:14,
609:6, 609:8,
611:10, 631:23,
653:6, 655:15
today's [2] - 563:2,
563:4
together [18] - 393:24,
394:18, 395:9,
410:7, 411:4, 426:5,
477:15, 557:14,
597:16, 610:10,
610:11, 615:3,
616:21, 656:11,
659:7, 673:9,
673:15, 673:19
Tolerant [1] - 641:3
tomorrow [3] -
688:10, 691:1,
691:15
took [19] - 371:9,
383:16, 385:20,
420:13, 420:24,
421:1, 421:15,
439:20, 465:18,
469:24, 487:7,
557:3, 559:14,
559:19, 596:22,
598:14, 599:10,
616:10, 624:7
tools [2] - 388:15,
405:8
top [6] - 425:23,
519:5, 562:19,
602:1, 665:14, 667:8
topic [4] - 359:24,
657:11, 660:1, 663:7
topics [4] - 353:6,
472:17, 481:14,
481:24
TORCHIA [6] - 348:22,
357:14, 357:20,
358:24, 359:19,
360:10
Torchia [3] - 357:1,
358:23, 363:6
total [7] - 403:5,
410:5, 483:22,
488:14, 581:9,
622:12, 624:7
totally [1] - 587:19
touch [2] - 445:11,
659:3
touched [1] - 385:14
tough [2] - 623:4,
625:22
toward [1] - 665:11
towards [1] - 477:16
TPV [1] - 566:21
track [2] - 477:11,
517:1
trade [2] - 492:6,
615:12
tradition [2] - 411:8,
460:24
trajectory [1] - 401:13
transcript [1] - 692:11
transfer [3] - 397:6,
398:3, 398:4
transistors [1] -
407:19
transition [3] - 443:12,
443:15, 443:18
translation [1] -
630:14
transmits [1] - 535:16
Trial [1] - 348:4
trial [7] - 355:13,
507:20, 664:6,
664:9, 666:22,
678:18, 678:24
trick [1] - 621:19
tried [4] - 357:1,
501:9, 501:10,
689:12
trivial [2] - 618:18,
623:2
trouble [1] - 624:16
true [16] - 352:6,
355:1, 455:10,
469:19, 470:19,
471:1, 557:23,
558:1, 563:12,
563:13, 573:11,
576:1, 576:4, 586:9,
594:15, 692:10
try [11] - 417:5, 434:7,
444:1, 526:11,
533:4, 562:3,
623:13, 688:11,
688:12, 689:2, 690:5
trying [26] - 405:8,
406:13, 416:20,
436:16, 442:7,
445:14, 447:15,
461:10, 467:7,
471:2, 477:20,
495:13, 498:18,
499:3, 516:19,
560:21, 602:18,

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619:7, 622:21,
623:10, 623:20,
631:4, 679:24,
681:20, 681:21,
689:12
Tuesday [1] - 348:10
TUNNELL [1] - 348:19
turn [27] - 371:21,
376:4, 378:13,
379:18, 383:19,
422:3, 462:22,
467:22, 503:14,
506:1, 506:20,
513:18, 521:6,
521:13, 529:10,
530:22, 533:16,
540:3, 553:4,
553:24, 593:3,
594:3, 594:6,
594:14, 603:7,
617:11, 657:20
turnaround [1] -
502:16
turned [5] - 533:3,
594:10, 594:11,
594:18, 594:21
turning [4] - 392:15,
493:21, 500:18,
522:23
twenty [2] - 363:18,
498:6
twice [2] - 497:22,
602:6
two [64] - 351:6,
354:9, 355:24,
358:3, 385:24,
386:19, 392:16,
393:5, 403:4, 403:8,
405:17, 425:16,
427:4, 430:2,
439:11, 460:1,
468:16, 468:17,
468:24, 469:5,
469:8, 469:16,
469:20, 470:3,
477:15, 477:22,
479:22, 480:2,
480:8, 484:22,
491:5, 493:18,
495:2, 497:10,
497:19, 499:12,
504:1, 513:15,
529:12, 537:24,
538:1, 538:3,
538:13, 538:18,
539:17, 541:20,
546:15, 547:18,
560:20, 570:16,
574:1, 574:8,
577:13, 577:24,

603:10, 604:24,
610:7, 616:20,
621:3, 622:8, 625:9,
658:3, 658:10,
690:13
type [9] - 376:13,
613:7, 622:15,
623:6, 644:10,
656:21, 662:5,
662:20, 683:16
types [3] - 566:3,
684:5, 684:9
typical [3] - 388:15,
396:7, 441:22
typically [17] - 383:14,
386:9, 396:10,
399:16, 406:18,
408:23, 428:1,
428:5, 429:24,
490:1, 490:18,
492:8, 495:9,
518:23, 622:2,
622:3, 676:2
uhs [1] - 633:18
ultimately [5] -
542:23, 573:2,
592:17, 660:12,
682:1
unable [1] - 456:9
unacceptable [2] -
550:16, 564:8
under [10] - 457:17,
464:14, 470:14,
528:14, 528:24,
543:5, 586:3,
605:13, 640:17,
650:13
undergraduate [1] -
654:17
undergraduates [1] -
654:19
understandably [2] -
375:18, 633:12
understood [9] -
373:19, 374:15,
375:12, 406:5,
406:10, 411:4,
578:16, 637:20,
652:12
undisputed [1] - 358:2
unfairly [1] - 688:22
unique [6] - 388:12,
410:3, 562:7,
562:21, 570:15,
685:23
unit [2] - 672:2, 677:7
UNITED [1] - 348:1
United [13] - 348:15,
391:2, 391:4,
391:13, 391:20.

482:10, 482:23,
482:24, 483:23,
530:9, 530:11,
530:15, 530:18
units [14] - 670:7,
670:18, 670:20,
671:17, 671:19,
671:20, 672:4,
672:6, 673:9,
673:11, 673:12,
678:10
University [17] -
383:4, 383:6,
383:13, 385:23,
386:8, 390:7,
390:10, 390:11,
390:17, 392:2,
394:4, 476:22,
611:18, 612:1,
653:22, 653:23,
654:9
university [13] -
383:14, 386:11,
390:6, 390:8,
394:24, 395:4,
395:7, 439:19,
487:3, 568:6, 568:7,
654:13, 655:2
unless [1] - 361:21
unnecessarily [1] -
635:15
unnecessary [1] -
650:22
unpack [1] - 442:23
unpacking [1] -
464:19
up [129] - 357:21,
359:20, 364:20,
366:2, 366:22,
366:23, 367:5,
374:8, 374:18,
374:19, 375:2,
385:24, 386:18,
389:23, 389:24,
390:8, 394:16,
395:3, 396:8, 396:9,
396:10, 396:11,
399:23, 400:11,
406:10, 407:10,
408:3, 408:24,
409:6, 410:18,
414:15, 416:7,
417:13, 418:9,
418:12, 421:2,
434:1, 436:23,
439:16, 441:9,
444:22, 449:14,
455:8, 461:2,
463:17, 466:7,
475:1, 477:13,

481:13, 484:11,
484:19, 490:19,
491:19, 495:4,
495:13, 502:20,
508:18, 513:19,
516:14, 520:5,
526:12, 529:20,
535:6, 552:3, 552:7,
559:13, 559:20,
561:17, 562:8,
562:10, 562:13,
563:14, 570:1,
572:6, 572:9, 575:8,
582:20, 584:1,
584:3, 586:1,
595:15, 597:5,
602:7, 605:1, 605:2,
606:1, 609:11,
615:16, 616:10,
617:24, 618:20,
619:23, 620:11,
626:12, 627:20,
631:16, 633:13,
633:23, 634:13,
635:3, 636:10,
636:17, 638:9,
639:9, 641:6, 642:7,
647:22, 648:7,
648:10, 648:15,
650:18, 655:20,
661:5, 661:9,
661:17, 665:12,
665:14, 666:4,
672:5, 673:3,
673:13, 675:4,
675:13, 675:18,
681:22, 685:12,
688:23
update [6] - 419:6,
576:18, 584:24,
585:16, 586:24,
589:6
updated [2] - 373:3,
577:13
updates [1] - 584:19
updating [6] - 572:2,
572:4, 585:6,
585:11, 587:17,
588:23
upper [6] - 379:3,
418:17, 609:24,
667:24, 668:11,
681:4
ups [1] - 607:4
upset [1] - 438:8
US [5] - 390:3, 390:16,
392:10, 611:12,
617:8
usable [1] - 620:1
usage [2] - 560:7,

560:13
useful [3] - 555:23,
621:8, 630:11
usefulness [1] -
516:16
user [2] - 498:18,
506:5
users [10] - 407:14,
409:10, 498:18,
506:2, 506:15,
666:7, 666:24,
667:1, 674:14,
674:19
uses [13] - 369:8,
380:19, 381:3,
513:22, 518:18,
592:3, 604:15,
620:4, 654:21,
667:11, 679:23,
680:1, 682:8
utilize [1] - 626:15
vague [2] - 409:23,
645:21
validate [1] - 426:22
value [4] - 441:9,
526:20, 581:14,
650:15
values [3] - 539:2,
539:8
van [1] - 354:6
VAN [88] - 349:11,
349:11, 350:4,
350:8, 350:11,
350:14, 354:8,
354:20, 355:8,
355:12, 358:5,
358:10, 358:18,
359:22, 361:4,
362:1, 362:14,
362:21, 363:1,
411:24, 412:15,
412:18, 413:14,
413:18, 413:20,
414:17, 414:24,
415:9, 416:17,
419:21, 424:14,
430:8, 431:22,
433:3, 433:11,
434:15, 435:2,
435:14, 436:2,
436:18, 436:21,
437:12, 438:9,
438:20, 438:24,
439:2, 445:13,
445:17, 450:14,
450:20, 452:2,
452:3, 453:3,
453:12, 454:11,
454:13, 458:3,
458:10, 460:20,

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| | | | | |
|--|--|--|---|---|
| 465:8, 465:15, 474:9, 475:16, 488:22, 506:9, 525:9, 531:13, 531:16, 532:14, 532:22, 544:16, 546:6, 546:17, 549:5, 553:14, 554:6, 564:13, 564:16, 564:20, 564:24, 583:5, 601:17, 604:8, 604:17, 631:22, 632:2, 689:21, 691:11 Van [23] - 358:4, 361:3, 361:11, 365:2, 366:12, 433:19, 434:14, 435:13, 437:7, 438:1, 438:18, 452:1, 454:10, 458:8, 460:18, 465:13, 475:21, 475:24, 603:8, 605:6, 605:20, 607:7, 690:15 variable [2] - 539:6, 539:13 varies [1] - 685:22 variety [2] - 590:22, 590:23 various [4] - 375:20, 407:19, 584:6, 628:19 VDI [5] - 377:9, 377:10, 377:22, 379:13, 379:17 vendor [1] - 592:21 Venti [7] - 434:6, 437:2, 449:10, 449:13, 450:8, 450:21, 451:12 venture [3] - 394:9, 447:9, 477:12 Ventures [1] - 446:21 verba [1] - 353:21 verbal [1] - 449:23 verbatim [1] - 651:4 verified [1] - 622:4 verifying [1] - 415:22 version [27] - 367:21, 368:10, 368:14, 373:1, 427:12, 427:13, 428:2, 428:6, 428:8, 428:16, 429:12, 456:5, 457:21, 458:17, 458:20, 458:22, 458:23, | 459:1, 459:3, 459:7, 459:13, 459:21, 462:11, 462:18, 462:19, 462:21 versioning [1] - 427:24 versions [1] - 619:15 versus [3] - 566:21, 622:5, 642:8 VHS [1] - 395:17 video [1] - 669:11 videotape [1] - 690:12 videotapes [1] - 395:17 view [31] - 453:18, 522:14, 522:15, 525:7, 525:15, 527:17, 527:24, 542:1, 543:24, 544:9, 545:14, 547:4, 548:3, 550:9, 550:15, 555:7, 556:11, 559:14, 559:18, 593:10, 594:23, 602:17, 604:22, 605:16, 658:1, 659:4, 679:6, 680:5, 683:24, 684:6, 685:23 viewed [1] - 442:15 viewing [1] - 524:7 views [2] - 544:14, 548:4 violation [3] - 354:18, 355:10, 541:21 Virginia [4] - 652:19, 653:3, 653:4, 654:12 virtual [3] - 377:10, 630:13, 645:10 vision [1] - 427:13 VMAX [5] - 367:21, 368:6, 368:10, 368:14, 613:14 voice [1] - 483:16 Volume [1] - 348:4 volume [1] - 596:5 volunteered [1] - 414:9 wait [2] - 458:8, 643:6 waiting [1] - 502:14 walked [1] - 532:18 Walton [1] - 610:9 wants [6] - 531:12, 620:21, 621:15, 630:17, 680:2, 689:18 war [1] - 400:10 War [1] - 390:4 warm [1] - 532:15 waste [2] - 477:2 | 688:13 Watson [1] - 376:18 ways [19] - 366:18, 368:21, 406:2, 513:13, 513:15, 519:19, 523:5, 523:11, 523:12, 524:5, 529:17, 533:23, 537:20, 539:18, 540:5, 542:19, 603:11, 620:4, 681:21 wear [3] - 498:8, 498:24, 543:19 wears [1] - 498:4 website [2] - 661:14, 661:23 week [3] - 411:21, 415:20, 688:21 weekend [1] - 616:4 weekends [1] - 399:17 weekly [1] - 396:10 weeks [2] - 381:13, 477:15 welcome [6] - 367:18, 380:2, 438:16, 533:2, 533:11, 636:14 well-known [4] - 435:3, 435:4, 435:9, 642:9 WERDEGAR [7] - 349:12, 367:14, 372:3, 377:1, 377:6, 379:24, 380:20 Werdegarr [3] - 367:12, 380:8, 381:2 WERDERGAR [2] - 367:16, 372:8 Wesley [1] - 612:2 Western [1] - 642:19 wherein [2] - 507:5, 536:16 WHEREOF [1] - 692:14 white [21] - 411:7, 411:8, 411:9, 411:15, 416:10, 416:14, 418:3, 423:18, 428:12, 428:14, 428:16, 428:20, 468:5, 470:9, 470:16, 471:10, 471:12, 471:16, 609:10, 681:9 whiteboard [19] - 417:11, 417:17, 417:22, 417:23, 418:2, 418:4, 418:8 | 419:16, 420:4, 420:14, 420:24, 421:8, 422:5, 423:10, 423:17, 424:22, 426:7, 462:23, 475:22 whiteboarding [1] - 624:2 whole [6] - 366:17, 396:11, 434:16, 473:14, 506:18, 606:8 wide [4] - 567:1, 567:3, 631:4, 631:7 widely [1] - 396:2 Wilmington [2] - 348:13, 692:16 Winchester [8] - 484:14, 484:16, 484:24, 485:1, 485:2, 485:4, 485:11, 485:15 window [2] - 388:17, 388:20 Windows [1] - 505:1 windows [1] - 539:14 wins [1] - 374:12 Wisconsin [1] - 390:11 wish [1] - 403:11 withdraw [3] - 353:23, 354:23, 597:1 withdrawing [1] - 353:9 withdrawn [2] - 354:14, 354:24 withdrew [1] - 354:3 witness [33] - 358:19, 363:16, 364:7, 367:4, 382:7, 414:7, 433:12, 433:16, 433:21, 436:9, 438:21, 441:16, 451:18, 458:1, 460:16, 478:17, 479:10, 521:1, 544:4, 565:4, 567:14, 607:24, 608:3, 636:17, 638:24, 641:7, 641:23, 646:12, 650:3, 651:3, 651:5, 652:3 WITNESS [16] - 367:6, 380:2, 382:3, 432:17, 451:22, 453:10, 458:12, 465:14, 474:5, 478:15, 479:2, 549:9, 583:3, | 608:10, 650:1, 692:14 witnesses [10] - 350:12, 632:8, 632:14, 633:1, 634:21, 671:10, 671:13, 677:4, 685:8, 690:13 won [1] - 400:10 wondering [2] - 435:20, 641:19 word [11] - 453:11, 489:21, 495:7, 511:9, 537:12, 547:15, 656:9, 656:12, 662:11, 667:12, 689:23 words [7] - 354:12, 366:15, 413:5, 594:4, 594:18, 622:4, 633:13 work/life [1] - 617:7 workable [1] - 624:9 workload [2] - 427:1, 562:21 works [20] - 389:8, 446:3, 493:24, 494:2, 495:23, 505:19, 513:21, 520:12, 524:10, 573:1, 577:20, 578:1, 581:1, 581:7, 620:15, 627:5, 657:1, 663:19, 685:9, 687:9 workstation [1] - 490:1 World [1] - 390:4 world [3] - 493:5, 502:8, 620:19 worry [1] - 471:6 worst [21] - 595:24, 596:4, 596:10, 598:14, 598:15, 598:18, 598:19, 599:11, 599:12, 599:17, 599:19, 599:20, 599:21, 600:1, 600:2, 601:13, 601:14, 603:5 wrap [3] - 631:16, 673:13, 685:12 write [35] - 397:1, 425:15, 425:16, 426:1, 426:13, 426:17, 426:19, 459:4, 459:12, 497:4, 497:22, 498:8, 502:5, |
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| | | |
|--|--|-----------------------------------|
| 505:14, 573:5, 618:5, 618:6, 670:6, 670:18, 670:20, 671:20, 672:1, 672:4, 672:6, 673:7, 673:9, 673:11, 673:12, 673:21, 673:23, 674:1, 675:20, 680:3 writes [5] - 373:9, 374:3, 375:4, 498:7, 625:12 writing [7] - 353:9, 418:4, 421:13, 427:1, 490:12, 502:9, 578:18 written [3] - 508:5, 543:17, 555:22 wrote [11] - 372:24, 375:10, 411:6, 425:1, 425:12, 459:3, 463:2, 546:23, 555:18, 566:22, 580:5 XOR [2] - 647:22, 647:23 XR [2] - 620:18, 621:15 Xtreme [1] - 371:13 XtremeIO [19] - 351:11, 351:21, 370:16, 370:20, 370:24, 371:3, 371:8, 371:10, 371:14, 371:16, 372:16, 373:6, 373:21, 374:17, 374:22, 375:11, 375:14, 445:8, 446:7 XtremeIO [9] - 381:7, 381:21, 591:6, 591:16, 659:17, 659:21, 659:23, 659:24, 663:17 XtremeIO's [2] - 380:10, 381:17 Xyratex [3] - 488:8, 488:9, 488:10 Yale [5] - 390:17, 390:19, 391:19, 391:21, 392:8 year [35] - 370:14, 386:3, 390:23, 397:24, 400:14, 400:21, 401:5, 401:19, 401:22, 402:3, 402:5, 402:7, 402:16, 402:17, 402:18, 402:19, 402:22, 403:2, | 432:6, 440:17, 440:20, 441:1, 444:23, 449:15, 449:16, 476:21, 561:12, 568:14, 595:24, 596:4, 598:15, 612:11, 624:8, 624:10, 624:12 years [34] - 371:9, 383:9, 383:16, 387:16, 394:2, 402:10, 403:4, 403:8, 403:22, 408:1, 408:5, 430:3, 456:12, 462:3, 462:8, 464:11, 465:23, 469:2, 470:1, 476:15, 483:1, 483:22, 488:13, 488:18, 565:9, 565:10, 610:15, 612:5, 612:9, 613:16, 616:17, 616:22, 616:23, 654:6 yellow [2] - 521:24, 658:11 yesterday [6] - 363:16, 367:20, 370:20, 370:23, 371:9, 524:7 yourself [10] - 383:2, 447:1, 454:5, 463:2, 520:7, 520:24, 609:1, 652:16, 664:1, 688:19 Z-A-D-I-A-N [1] - 487:17 Zadian [3] - 487:15, 487:20, 488:6 Zadok [24] - 537:20, 542:13, 544:4, 556:18, 556:24, 557:4, 557:7, 557:14, 558:9, 558:13, 558:15, 559:10, 560:6, 563:11, 563:16, 564:2, 577:19, 578:6, 580:2, 582:9, 586:14, 595:15, 603:19 Zadok's [3] - 561:24, 581:11, 581:20 Zahid [1] - 372:1 zero [6] - 428:3, 438:5, 561:16, 621:4, 621:14, 621:18 zeros [1] - 657:21 | Zhu [2] - 394:2, 410:24 |
|--|--|-----------------------------------|

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